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VOL. II.—41ST YEAR

SYDNEY, SATURDAY, JULY 24, 1954

No. 4

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The Arthur E. Mills Memorial Oration.¹

THE MEDICINE MAN AND THE MEDICAL MAN.²

By A. D. TRENDALL, M.A. (Cambridge), M.A.,
Litt.D. (New Zealand), F.S.A.,

Master of University House, Canberra, A.C.T.

DIGNUS NON SUM was the answer that immediately crossed my mind when I received from your College the very flattering invitation to deliver the fourth Arthur E. Mills Memorial Oration. I have no special qualifications for this task, and my acceptance of so great an honour was perhaps prompted by the feeling that it was entirely proper for the last speech I shall deliver as Professor of Greek in the University of Sydney to be in honour of a man who made as lecturer, professor, dean, senator, and not least as just Mills himself, so notable a contribution to that University, and who was at the same time a student and

lover of Greek. Indeed, he might well be regarded as a sort of medical Socrates, since he made the question "why?" the burden of his every lecture, thereby forcing his students to get down to basic principles and to examine causes in a way that would have delighted the ancient Greeks.

On the walls of the cave of the Three Brothers in the hills of the Pyrenean province of Ariège in the far south of France is a series of paintings made by artists of the Cro-Magnon period, perhaps twenty thousand or more years ago, at any rate at the earliest dawn of our civilization. One of them is a most dramatic representation of a man in a semi-crouching position, clothed in the skin of a deer and bearing upon his head its branching antlers; he turns round to look at us with piercing eyes, and we feel not a little of the awe in which his fellow-tribesmen must have beheld him, for we are looking upon the first known portrait of a physician. He is presented to us in the guise of the tribal witch-doctor—grotesque in attire that he may attract the attention of his patients and take their thoughts away from the pain they are suffering, yet surrounded with an aura of mystery and dread so that their fear-inspired faith in his healing powers may abide unshaken. Primitive peoples associated disease with supernatural forces, and it was the function of the witch-doctor after diagnosis of the illness to give the appropriate remedy, and thus outwit the malevolent demon or human sorcerer who had caused the malady. His cure would involve the use of methods and

¹Delivered at a meeting of The Royal Australasian College of Physicians, Melbourne, May, 1954.

²I am deeply indebted to Professor E. Ford for help in the preparation of this oration and for the loan of several relevant books, especially "The History of Medicine", by A. Castiglioni, from which I have drawn freely.

materials which might be of real medicinal and restorative value, even if this was not always fully realized or understood; but in addition there would be much of magic formulae and ritual, the value of which we can best describe as psychological, for it was calculated to win the patient's confidence and, by making him believe that the immediate cause of his pain had been removed, to strengthen his faith in ultimate recovery and to reinforce his will to live.

The early connexion between medicine and religion is clear, and such a practitioner was fortunate in that success was counted entirely to his own credit, while failure could always be blamed upon the supernatural. It is not difficult to understand how he could win for himself a position of power in a primitive community, which in unscrupulous hands could readily be turned to sinister ends.

Within his make-up we can discern two conflicting elements, which may be likened to the forces of good and evil. One is the skill and knowledge he has acquired, often after a prolonged period of training culminating in a qualifying test, or rather ordeal, beside which a modern Fellowship examination seems a very pallid affair; from this element springs the true physician, whose calling is a dedication to the service of mankind, and who seeks for himself no reward beyond the infinite satisfaction of preserving human life. The other is associated with the use of magic charms or incantations and all the mumbo-jumbo that is practised to dazzle and impress the patient: this furnishes the stock-in-trade of the charlatan, who through the ages has sought power and profit by pandering to and trading upon human credulity. Not infrequently the two elements may be combined. This need not be harmful, provided the latter is present only to a limited extent and well under control, just as a poison, administered in minute and regulated doses, can be used to cure and not to kill. But when it predominates the result is highly dangerous, for there emerges that sinister figure best designated as the medicine-man—a word normally of evil connotation—who veils ignorance behind high-sounding polysyllables, who seeks to exploit human weakness to his own advantage, and whose ethics are those of self-interest alone. The history of medicine sheds an interesting light upon the continual struggle between these elements, and it is my purpose tonight to touch briefly upon a few of the more significant aspects of its course.

By the time we reach that stage in the march of civilization where man is able to leave us a written record of his achievements, we see that enormous progress has been made in medicine, though it is still dominated by a concept essentially magical and its profession is closely related to the priesthood. The importance of medical practice in ancient Mesopotamia is clearly revealed in the Code of Hammurabi (*circa* 1700 B.C.), which for the first time gives official recognition to the responsibility of a doctor towards his patient:

If a physician shall make on anyone a severe wound with an operating knife and cure him, he shall receive ten shekels of silver . . . but if he kill him, his hands shall be cut off.

Such a sanction must have been a strong deterrent to unnecessary operations and a stern discouragement to the charlatan. In ancient Egypt also medical practice was controlled by special regulations, with physicians holding a clearly defined place in the complicated social system in what might almost be called an organized medical association, at first again closely allied with the priesthood. Yet although in antiquity the Egyptians enjoyed the reputation of being excellent doctors and even, according to Herodotus,¹ who tells us that "each physician applies himself to one disease only and not more", achieving a large measure of specialization, the very rigidity of their ritual and their jealous refusal to transmit their discoveries to any but the few chosen and privileged experts brought about a sterilization of the healing art, since those who seek to shroud Nature in an impenetrable veil of mystery or taboo are unlikely to be granted a very clear vision of the scientific principles upon which her laws are based.

Not until we come to Greece does medical thought shake itself free from magic concepts and priestly dogmatism, and attempt to reestablish itself on the basis of scientific observation and analysis. The speculative mind of the enquiring Greek could not long be content with a divine or magical explanation of the cause of disease: the very opening of the Hippocratic treatise on epilepsy, the so-called sacred disease, banishes the gods from medicine:

It is not in my opinion any more divine or more sacred than other diseases, but has a natural cause, and its supposed divine origin is due to men's inexperience and to their wonder at its peculiar character.

In the works of the Hippocratic school we see the beginnings of a truly scientific attitude to medicine, as "an art which considers the constitution of the patient, and has principles of action and reasons in each case". Their carefully documented case histories, their critical approach towards wonder-drugs, their appreciation of the healing powers of Nature, and above all their lofty concept of medical ethics are indications that medicine has come to a turning-point in its history, and is now being skillfully directed to its one true goal—the cure of the patient, through correct diagnosis and proper treatment.

The notable advance in medicine which the Hippocratic approach signifies might be thought to represent the triumph of the better element in the make-up of our primeval witch doctor; but the darker forces of magic are still with us in the priest-healers of the sanctuaries of Asclepius who, through greed of gain, had exploited and corrupted the ancient art of mental therapy. From this fatal taint, even Asclepius himself was not altogether free, for Pindar² tells us:

Whosoever came to him suffering from natural ulcers, or with limbs wounded either by grey steel or far-hurled stone, he loosed and delivered from diverse pains, tending some with kindly incantations, giving to others a soothing potion, or swathing their limbs with simples, and restoring others by the knife. But alas! even the lore of leech-craft is enthralled by love of gain and he was seduced by a splendid fee of gold displayed upon his palm . . .

This explains the significance of the bitter jest with which Socrates, after drinking the fatal cup of hemlock, greets the approach of death—"I owe a cock to Asclepius, see that the debt is discharged"—or the voice that was heard on one occasion in the sanctuary of the god crying aloud to a forgetful patient: "Thou art healed, now pay the fee."

At first the sacred precincts seem to have been largely used for the treatment of patients by exercise and dieting, coupled with the relaxation of mind and body, and this not unnaturally often resulted in the complete cure of those who were suffering from ailments primarily mental or psychological. Once the sanctuaries were invaded by charlatanism and a strong desire for quick profits, we find their records increasingly filled with tales of miraculous cures, always the result of divine suggestion or intervention. Indeed the god did not stop short of celestial surgery on occasions, for we are told how he cured a Spartan girl of dropsy by cutting off her head and turning her upside down until all the fluid ran out, after which he duly replaced the head and sent her home rejoicing. That not all the Greeks were so credulous, however, may be seen from the biting satire in the *Plutus* of Aristophanes on Aesculapian treatment and technique, wherein the tricks of the god and his priests are exposed; yet the quack doctor with his cure-alls must have been a common sight in fourth century Greece, to judge from the frequency of his appearance on the comic stage. Nor is it altogether surprising that such charlatans generally have at their disposal a fine collection of documents enthusiastically supporting their skill or nostrums—those of their victims who have been cured of some purely imaginary complaint are pleased to express their gratitude, and the dead, of course, write no testimonials.

It is interesting to note that five hundred years later Lucian can still satirize the same practices as Aristophanes.

¹ *Pyth.* III, 47.

His *Alexander* is a devastating commentary on the gullibility of his age, when people were prepared to pay vast sums to a clever quack who, realizing how many fat sheep there were to be shorn in Aesculapian pastures, reincarnated the god in serpent form and proceeded to establish an oracle that speedily won world renown, to his own great profit and prestige.

The Alexandrian school of medicine devoted the closest study to the Hippocratic writings and particularly to the new frontiers opened up by the critical and scientific genius of Aristotle. Anatomy, physiology and pathology now become the subject of enthusiastic research, in order to fill the gaps in existing knowledge, but it is one of the great tragedies of medicine that just at the moment when it seemed about to make enormous advances along these new and vital paths, the world around it began a rapid process of disintegration by which it too became infected, with the result that scientific progress gave way to textual criticism, and the teachings of Hippocrates became narrowed down to an increasingly dogmatic empiricism, which maintained that the basis of all experience should be firstly personal observation, secondly the records of the observations of others, and thirdly analogy. At the same time, the changing conditions of a world in dissolution aided the return of mysticism, occultism and all kinds of magic practices from the east; thus the flame of scientific research which had been kindled by the Greeks and had burnt so brilliantly for a couple of centuries died almost completely away.

Early Roman medicine was extensively based on magic, and there is a surprisingly large host of minor tutelary deities to whom appropriate offerings might be made as a protection against almost all the ills which beset mankind—Febris for malaria, Scabies for Itch, Angina for quinsy, *et cetera*.

The practice of medicine was one of the functions of the *paterfamilias*, and we find the elder Cato, that arch apostle of the old Roman way of life, tirading against the new Greek methods that were gradually beginning to gain ground as a result of Rome's eastward expansion. "The Greeks", he writes to his son, "are a most worthless and perverse race . . . whatever knowledge that nation brings to Rome will corrupt us, and most especially if it sends its physicians hither . . . I forbid you any dealings with physicians." Cato himself evidently set great store by good old-fashioned home remedies, and seems to have had particular faith in the healing powers of cabbage, which in his opinion¹ promotes digestion, is an excellent laxative, and cures headache, eyache, and colic, as well as healing bruises, ulcers and dislocations, though a better treatment for the last-mentioned consists of splitting a green reed, binding it to the injured parts and chanting the while "*Huat huat huat, ista sista pista, dannabou dannaustra*". In the face of such nonsense it is no real cause for wonder that Greek physicians flourished and Cato's advice to his son was not widely followed.

Medicine, however, continued to be regarded in Rome as a profession almost beneath the dignity of a true Roman citizen, and this perhaps explains why there are so few Roman treatises on the subject. Of these the encyclopædia of Celsus deserves high credit as the first attempt to write a systematic history of the subject: he follows closely the methods of the Hippocratic school as well as their high ethical standards, and calls upon medical men to admit their errors, that they may thus prevent their successors from making similar mistakes. Here speaks the voice of the true physician; but it found no response among the myriad quacks who flourished in the Empire, if we are to believe the picture painted by the contemporary satirists, who are always recommending people to keep doctors from their door as long as possible and commenting acidly upon their apparent partnership with the undertaker.

Into this world in the year 162 A.D. came a physician whose writings were destined to be regarded in mediæval times almost as oracles—Galen, a fine example of the

mixture of our two elements. As a medical man we see him as a bold experimentalist in anatomy and physiology, a keen diagnostic observer and a skilful dietitian; yet in his make-up there was not a little of the mountebank who knows all and has a cure for everything, as can be seen from his rejoicing in the title of "Wonder-Worker". "I have done as much for medicine", he writes, "as Trajan did for the Roman Empire", and he proceeds to give Hippocrates a very small measure of credit for opening the path and himself a very large one for making it passable. Galen's besetting sin was obviously vanity, and it was appeased only by the creation of a system which left his authority infallible. The result was the promulgation of a series of dogmatic hypotheses calculated to make his own observations fit into the preconceived notion that every part of the human organism corresponds to some naturally ordained purpose. So Galen settled down to give an explanation for everything, and such was his authority that we owe to him the perpetuation of many fundamental errors, which in fact produced a long pause in medical development, since succeeding generations, preferring the dogmatic to the critical approach, accepted his dictates but neglected the principles behind them, forgetting that "the letter killeth but the spirit keepeth alive". Therefore, while Galen's research should have marked the rebirth of scientific medicine, his hypotheses ensured that it was still-born, and its ceremonies were provided by the coming Byzantine era, which, on the one hand, introduced a philosophic mysticism wherein magic and astrology flourished, with the replacement of the prescription by the incantation, and, on the other, invested dogmatic medicine with all the authority of the early Christian church. Over a thousand years are to pass before its resurrection.

During this long period Western Europe was devastated by wars, invasions and epidemics, and the human mind seems to have sunk into a strange torpor. Powerless to discover for itself the right road to follow, it seized with avidity upon the works of preceding ages, accepting them blindly and without question, arguing only about their interpretation, never about their validity. Under the dominating influence of religion, disease was thought to be the outcome of the wrath of God, and therefore its rational cure was to be achieved only by prayer and fasting. However, it often happened that unfortunate patients experienced no relief thereby and, despairing of hope from Divine clemency, gave themselves up to the devil or turned for magic potions, unguents and charms to the witches and sorcerers who figure so prominently in mediæval art and literature. In this dark age of ignorance the medicine-man flourished as never before, and such was his power that many preferred to maintain faith in his wares rather than to believe the results of experiment and demonstration. One of the sovereign remedies of the times was the bezoar stone, a small pebble found in the intestines of goats and other animals. These stones were regarded as possessing incredible curative properties and especially the power to detect or expel poison, in consequence of which they were greatly sought after and commanded high prices. Their miraculous qualities had from time to time been questioned, but no one had thought of actually testing them until Ambroise Paré prompted Charles IX of France to make the experiment. A condemned criminal was given poison and then made to swallow a bezoar stone; seven hours later he died in agony, but the king in no wise abandoned his faith in the stone—he merely maintained he had been sold a counterfeit, and straightway ordered the purchase of a new one. In the face of such beliefs we may not be altogether surprised at the following prescription solemnly set out in the year 1636 by the Royal College of Physicians as a cure for the plague and for the prevention of infection:

Take of the shavings of Hart's horne, of Pearle, of Corall, Tormentill rootes, Zedoarie,² true *Terra sigillata*, of each one dram; citron pills, yellow, white and red sanders, of each halfe a dram; white amber, hyacinth stone prepared, of each two scruples; Bezoar stone, of the East Unicorne's horne, of each 24 graines; citron and orange peel candied of each 3 drams; Lignum

¹ *De Re Rustica*, 156.

² Ginger.

aloes, one scruple; white sugar candie, twice the weight of all the rest. Mixe them well, being made into a powder. Take the weight of 12d at a time every morning fasting, and also in the evening about 5 o'clock or an hour before supper.

Mark the precision of the last sentence, giving that final touch of verisimilitude and authority to the whole.

With quackery enthroned in high places and able to command the respect of kings, it is not surprising that the rebirth of true medicine was a long and somewhat painful process. The publication in 1543 of the famous treatise by Vesalius on the fabric of the human body marks a second turning point in medical history, no less significant than the work of Hippocrates two thousand years earlier. While Vesalius admitted the greatness of Galen in anatomy, he did not hesitate to demonstrate his monumental errors, and by so doing he brought down upon his head the wrath not only of the university physicians but also of the church, since both felt that their authority was being challenged. But once even a small breach has been made in a fortress deemed impregnable, others take heart to follow up the first attack. Michael Servetus was burnt at the stake for his beliefs, and the book in which he had published his theories concerning the circulation of the blood perished with him in the flames, for unorthodox thinking was sternly discouraged in these times; but others were at work on the same subject, and in 1628 came William Harvey's immortal book *De motu cordis* which, summing up the results of years of experiment, demonstrated beyond doubt the phenomenon of circulation and did for physiology what Vesalius had done for anatomy. This is the age which laid the foundations of modern medicine, but progress was much more rapid in its science than in its practice, as the majority of the profession failed to keep pace with the new discoveries, and indeed, entrenched behind the ramparts of ancient tradition and governmental or ecclesiastical authority, and aided by the stupidity of the credulous, did their best to obstruct every new step forward. Yet, if the individual at times felt a victim, the idea triumphed, and medicine, returning to the investigative field it had so long abandoned, began to develop with ever-increasing sureness. The ranks of courageous pioneers swell, the diffusion of medical knowledge extends, the first scientific societies and learned journals appear, and the fortress of the medicine-man is under active siege. But there is still a long struggle ahead.

The political upheavals of the eighteenth century, together with its strong dogmatic and metaphysical tendencies, provided a less favourable atmosphere for medical advances. When we find the British Government, on the advice of three leading London doctors, paying Joanna Stephens £5000 for details of the medicine with which she claimed to dissolve stones in the bladder, its chief ingredients being soap and garden-snails crushed in the month of May, or Bishop Berkeley discoursing on the virtues of tar-water, which he regarded as a panacea no less potent than the elder Cato's cabbage, we begin to wonder whether the Age of Reason was rightly named. Towards the end of the century, however, new and more rational drugs began to replace the dried toads, crayfish eyes, viper's flesh and bezoar stones which had held such a prominent place in the pharmacopœia, and its closing years were illumined by Jenner's discovery of vaccination, an excellent example of the triumph of scientific observation and experiment. Another encouraging sign is the awakening of a social conscience, manifest in the growing desire to improve prison and hospital conditions and in a steadily increasing concern with the preventive aspects of medicine to the advantage of public health.

The succeeding age, sufficiently close to us to need no detailed definition, saw enormous progress in every branch of medicine. The invention of the stethoscope, the discovery of anaesthetics and antiseptics, and the rise of microbiology are landmarks in the history not only of medicine but also of mankind. Changing social conditions brought about at first a more materialistic approach to life, which was greatly aided by Darwin's evolutionary theories, and this must have contributed not a little to the weaning away of medicine from the metaphysical speculations on which

it had so long been nurtured. After centuries of wavering between religion and philosophy, magic and mysticism, dogmatism and rationalism, medicine returned again to reliance upon facts proved by experience, to the truths that can be confirmed by objective scientific evidence. For a time it looked as if the laboratory was to become the centre of medical activity at the expense of the clinic, but saner counsels prevailed, and a reaction against undue materialism has brought us back today to something very close to the Hippocratic ideal—studying at the bedside of the patient those factors which can best be observed there, but doing so in the light of that wider knowledge and deeper understanding which has been the invaluable contribution of the basic sciences to medicine. However potent, however marvellous may be the weapons which science can forge in her laboratory to arm the physician in his fight against disease, they must never be allowed to take him away from his post of honour beside the sick-bed, for it is there that the medical man will achieve his ultimate triumph, the cure of his patient.

It is only natural that the opening up of so many new frontiers in medicine should have given rise to a far greater measure of specialization than ever before, and it is here that we should perhaps pause to reflect upon one of the lessons of past history, that over-specialization, particularly when based upon insufficient knowledge, has generally been the precursor of a period of decline and decadence. However valuable the role of the specialist may be, and none would be so foolish as to deny his vital function in the medical world, we should not let our regard for him blind us to the vital part played by the general practitioner who, though he cannot and does not claim to be an expert in every field, is yet most peculiarly qualified to be the guardian of his patient's health by reason of an intimate knowledge of his circumstances, environment and medical history, and most of all by virtue of the confidence that is placed in him as a result of long association. By entrusting to him the care of our well-being, we yield to him a portion of that authority which Cato claimed for the *paterfamilias*; by making him as it were one of the family, we put him into a position where he can exercise an incalculable influence for good on both individual and community. The ideal physician of Hippocrates possessed "altruism, zeal, modesty, a dignified appearance, earnestness, tranquil judgement, serenity, decision, purity of life, the habit of brevity, knowledge of what is useful in life, reprobation of evil things and a mind free from suspicions", and I suppose that at no time in the long years which lie between his age and ours would he have felt himself more at home with the medical profession than today. I am sure he would have taken particular delight in that great figure in the history of Australian medicine whose memory we celebrate tonight—Arthur Edwin Mills—who possessed a boldly original mind, a keen wit and a profound knowledge of his subject, as well as high moral courage, kindness of heart, and above all, a deep sincerity. These are surely essential qualities of the ideal physician, just as they are those which so clearly mark the difference between the man of medicine and the medicine-man.

LEFT HEMICOLECTOMY FOR CARCINOMA OF THE COLON.

By E. S. R. HUGHES and R. H. KERNUTT,
Melbourne.

THE most effective treatment for carcinoma of the colon at the present time entails removal of the diseased portion of the colon together with as much of the regional lymphatic field as is possible. If there is extensive local spread extirpation of part or whole of an adjacent viscus such as the uterus or bladder may be necessary.

The behaviour of these tumours is unpredictable, and distant venous metastases and peritoneal dissemination may be present, but of microscopic size. In some instances,

when the tumour is small but deeply ulcerating, for example, the surgeon may suspect that cure is unlikely even with the most radical surgery; on the other hand, it is often apparent that a successful outcome depends largely on the ability of the surgeon to excise radically the tumour and lymphatic field.

In treating a carcinoma of the sigmoid or descending colon, many surgeons make the origin of the corresponding sigmoidal artery or left colic artery the upper limit of their pedicle resection (Figure 1A). This has been termed a "wedge resection".

Goligher (1949) demonstrated the anatomical disposition of the inferior mesenteric artery and its branches and showed that the left colic and first sigmoidal arteries often arose from the inferior mesenteric artery by a common stem. In about a third of cases the first sigmoidal artery had a separate origin about half an inch below the left colic artery. The second sigmoidal artery might also arise from the left colic artery, but usually it possessed an independent origin as do the remaining vessels. If the lymph nodes at the junction of the sigmoidal arteries with the inferior mesenteric artery are to be removed, the latter artery must be resected in part at least. This results in a more radical excision of the regional lymph glands. When the involved portion of the bowel is removed and the marginal artery divided, it is found that the rectum and recto-sigmoid zones and the descending colon down to the site of division of the marginal artery are viable (Figure 1B).

Moynihan (1908) stated that at the point of origin of the inferior mesenteric artery from the aorta lies a lymphatic gland, and quoted cases in which he had ligated this artery at its origin from the aorta in radical excisions for carcinoma of the left segment of the colon. Goligher (1908) found the average distance from the origin of this artery to the left colic artery to be one and a half inches, so that in this extended operation there is quite a considerable further removal of potentially involved nodes, apart from the certainty of including any around a conjoined left colic and first sigmoidal arterial origin (Figure 1C). That this operation is not the usual one practised is shown by the recent appearance of articles advocating its wider adoption (Ault, Castro and Smith, 1952; Grinnell and Hiatt, 1952; Aylett, 1953; Smallman, 1953). Grinnell and Hiatt (1952) found that in approximately 50% of 337 cleared specimens of carcinoma of the descending colon and rectum there were glands involved; in 41 cases a high ligation of the inferior mesenteric artery had been practised, and subsequent examination revealed that in seven of them metastases were present which would not have been removed if one of the more conservative operations had been performed.

In the region of the splenic flexure the middle colic vessels anastomose with the inferior mesenteric vessels, and for this reason there is no standardized extended operation for tumours occurring at this site. For example, Aylett (1953) recommends removal of the middle colic and left colic arteries, but not the inferior mesenteric artery itself. However, the splenic flexure is nearly always supplied by the left colic artery (Jamieson and Dobson, 1909; Steward and Rankin, 1933), and therefore in most cases the expected lymphatic spread is along the same inferior mesenteric chain; for this reason the writers believe that most tumours of the splenic flexure are best treated by left hemicolectomy.

The Operation.

After suitable preparation a laparotomy is performed. If the tumour is low in the sigmoid colon or is at the recto-sigmoid junction, it is an advantage to the surgeon to have the patient postured on the Lloyd-Davies stirrups, so that the rectum can be washed out during the operation and contamination minimized.

When the abdomen is opened, the extent of the resection is determined; and if it is decided to remove the whole of the inferior mesenteric artery, the duodeno-jejunal flexure is mobilized (Figure II).

The peritoneum is incised along the right side of the inferior mesenteric artery, and the incision is carried

upwards to the origin of that artery from the aorta (Figure III). The vessel is lifted off the aorta, a finger gently inserted behind it, and the artery tied. The inferior mesenteric vein lies about two centimetres to the left of the artery and is ligatured separately.

The colon including the splenic flexure is mobilized by dividing the peritoneum along its lateral aspect and is turned medially; at the same time the peritoneum with its contained vessels is gently separated off the posterior abdominal wall, so that the ovarian or spermatic vessels and the ureter are exposed. The marginal artery is preserved with care.



FIGURE I.

A: "Wedge resection" for carcinoma of the sigmoid colon. The sigmoidal vessels corresponding to the tumour are removed together with accompanying lymphatics. B: Partial resection of the inferior mesenteric vessels. This permits a much more radical resection without the necessity for mobilization of the splenic flexure. C: Total resection of the inferior mesenteric vessels. This allows the most radical removal of the lymphatic field of tumours of the left side of the colon.

Two sides of the area to be resected are now defined, the medial and lateral. The upper level will depend on the situation of the tumour; if it is in the sigmoid colon, the left colic artery is again divided and the peritoneal incision carried down towards the lower end of the descending

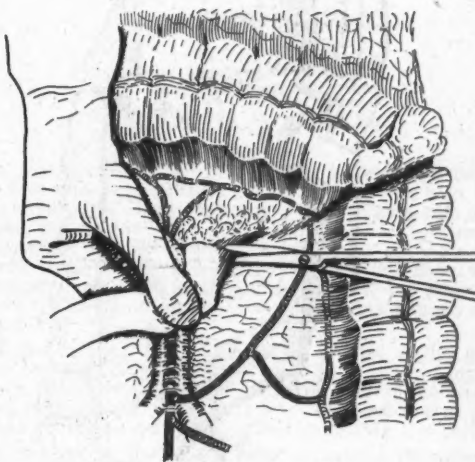


FIGURE II.

Mobilization of the duodeno-jejunal flexure to give a better exposure of the vascular pedicles.

colon; if the tumour is at the splenic flexure or in the descending colon, the left colic artery is removed with the specimen and the incision carried towards the distal end of the transverse colon. The marginal artery is divided; if the surgeon waits a few minutes a sharp line of demarcation appears in the colon, separating the obviously viable from the non-viable, and the colon is divided at this site.

The distal side of the resected zone again depends on the situation of the tumour. If it is low in the sigmoid

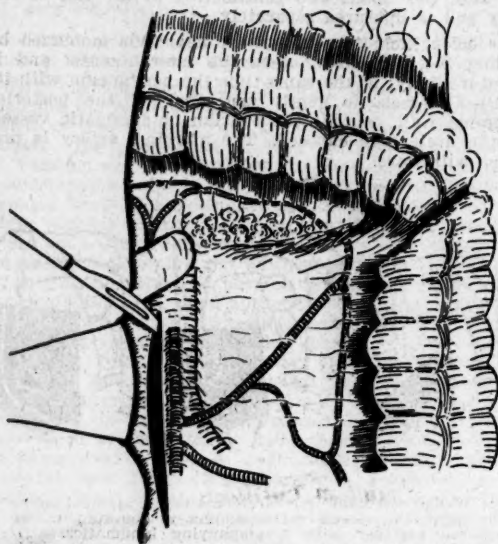


FIGURE III.

Incision of the peritoneum along the right side of the inferior mesenteric artery prior to its ligation at its origin from the aorta.

colon, the inferior mesenteric vessels are ligated below the promontory of the sacrum and the peritoneum is incised

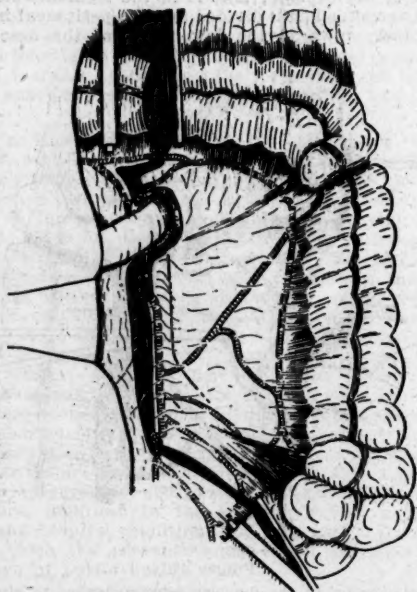


FIGURE IV.

Carcinoma of the splenic flexure. The inferior mesenteric vessels and the left main branch of the middle colic artery have been removed. The lowest ligature on the inferior mesenteric artery has been placed just below the second sigmoidal artery.

towards the bowel, with the resultant division of one or more sigmoidal arteries, and possibly a marginal artery,

although at this level it is usually replaced by smaller and poorly defined vessels. The bowel is divided about two or three inches above the peritoneal reflection. If the tumour is at the splenic flexure or in the descending colon, the second lower ligature on the inferior mesenteric vessels may be placed at a higher level, with possibly a greater preservation of bowel (Figure IV).

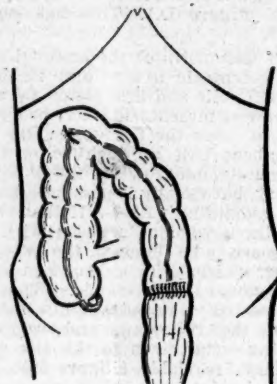


FIGURE V.

The transverse colon is anastomosed to the recto-sigmoid.

An end-to-end anastomosis can be completed without tension after such a resection by freeing the splenic flexure and by detaching the greater omentum from the transverse colon; the proximal divided colon can be brought well into the pelvis without difficulty and without jeopardizing the blood supply (Figure V). The distal end can also be mobilized by dividing the peritoneum around the rectum, but this is to be avoided if possible (Figures VI and VII).

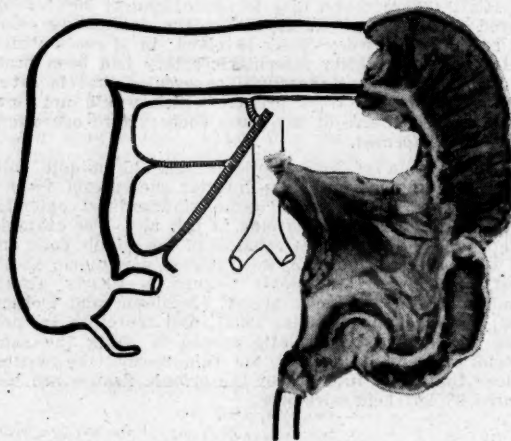


FIGURE VI.

Carcinoma of the descending colon (and endometriosis of the sigmoid colon). The specimen has been reconstructed to demonstrate the pedicle ligation at the aorta and the amount of bowel removed.

Discussion.

Extirpation of the entire inferior mesenteric lymphatic chain requires removal of the corresponding artery, and hence a greater length of colon must be resected. This presents no undue difficulty, and if the tissues are handled with due care, neither the mortality nor the morbidity is increased. This procedure cannot be placed in the category

of super-radical surgery with its many grave objections (Stone, 1953; Dunphy, 1953); it is the practical application of the principle in cancer surgery that the tumour and its lymph drainage should be removed as completely as possible. No functional disability results and a permanent colostomy is unnecessary.

Preliminary Preparation of the Bowel.

The performance of this operation is hampered by a preliminary colostomy, and even if the colostomy has been constructed in the hepatic flexure it may prove a serious obstacle to the surgeon who wishes to perform a radical excision and still obtain an end-to-end anastomosis of the

With expert anaesthesia and intravenous therapy the surgeon has time to observe the important vascular arrangements. An anastomosis, no matter how skillfully executed, will break down if the blood supply is inadequate. The most satisfactory evidence on which to rely is the colour of the bowel and the presence of bright red blood flowing from the cut edge of the bowel. The bowel is best not divided until the vessels have been dealt with, and this enables the surgeon to define accurately the bowel to be excised.

Drummond (1913) observed that the lowest sigmoid branch did not form an anastomosis with the superior hæmorrhoidal artery in an arcade fashion, and in about

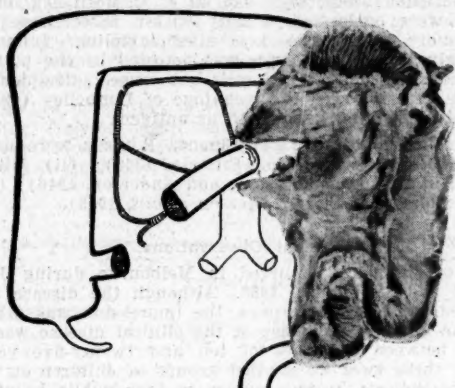


FIGURE VII.

Carcinoma of the splenic flexure. The specimen has been reconstructed to show the ligation of the inferior mesenteric artery at its origin and the ligation of the left main branch of the middle colic artery.

colon. A caecostomy through a muscle-splitting incision in the right iliac fossa has proved satisfactory in relieving acute obstruction when this has supervened upon a carcinoma of the colon. A tube two centimetres in diameter is inserted into the caecum and inverted with three purse-string sutures. The muscles are sutured loosely around the tube, but the skin is left open to minimize wound infection. Blocking of the tube is prevented by syringing it through with a few cubic centimetres of water six hours after operation and every six hours for the next two or three days. Rectal enemata can be administered after the first few days, and within seven to ten days of establishment of the caecostomy there is usually adequate defecation of the bowel. Preliminary caecostomy or colostomy is unnecessary in the absence of obstruction (Aylett, 1953).

Incision.

The oblique incision in the left iliac fossa has a serious disadvantage, in that the upper end moves away from the important pedicle. A transverse incision is contraindicated because the anastomosis is performed in the pelvis. The most satisfactory approach is through a long left paramedian incision, and to facilitate freeing the splenic flexure in difficult cases the incision at its upper end can be turned outwards to carry it into the line of the tenth rib.

Preservation of Adequate Blood Supply in the Colon.

In radical surgery of the left side of the colon the surgeon should have a sound knowledge of the basic arterial pattern of the bowel and an understanding of the potential collateral circulation. For example, Steward and Rankin (1933) found that the middle colic artery may be entirely absent and be replaced by the left colic artery; and Drummond (1913) demonstrated the importance of the marginal artery when, on injecting the ileo-colic artery in the presence of an intact middle colic artery, he was able to fill the vessels down to the mid-pelvic section of the colon.

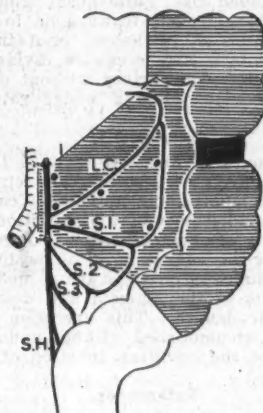


FIGURE VIII.

Carcinoma of the descending colon. The probable pathway of spread is along the left colic (L.C.) and first sigmoidal (S.I.) arteries. In such cases the lowest ligation can be placed on the inferior mesenteric artery at a level high enough to allow the collateral circulation from the inferior and middle hæmorrhoidal arteries to utilize the distal end of the inferior mesenteric artery to supply the sigmoid colon through the lowest sigmoidal arteries.

half the specimens he examined the anastomosis between the last and second last sigmoid arteries was also weak. The superior hæmorrhoidal artery divides as a rule at the upper end of the rectum or about midway between the promontory of the sacrum and peritoneal reflection; just before it divides it gives off one or two branches, which come off at right angles to the main trunk, and which run round the bowel on each side with little anastomosis above or below.

If the inferior mesenteric artery is tied at its origin from the aorta and retied at a level below the last sigmoid artery, after division of the marginal artery, the sigmoid colon becomes non-viable to a level of about two or three inches above the peritoneal reflection within the pelvis.

If the lowest tie on the inferior mesenteric artery is above the lowest two sigmoid arteries a greater length of bowel may retain its viability, making an anastomosis possible at a higher level. This is to be considered with tumours of the descending colon and splenic flexure, in which the main pathway for lymphatic metastases follows the left colic artery (Figure VIII).

A case reported recently calls for caution. The inferior mesenteric artery was ligated, and this resulted in infarction of the whole of the small bowel; subsequent examination revealed that a previous thrombosis in the superior mesenteric artery had been compensated by an extensive collateral rearrangement which enabled the inferior mesen-

teric artery to supply the whole of the small and large bowel (Shaw and Green, 1953). Such a catastrophe can be avoided by the use of arterial clamps, which are placed on the major arteries prior to their ligation.

Limitations to Radical Resection.

In operating on the obese with much fat in the mesentery, the anatomical disposition of the vessels is difficult to study and the surgeon must proceed warily; furthermore, in these cases mesenteries tend to be short and mobilization more difficult.

This radical operation takes longer to perform and requires wider exposure of the abdominal cavity. It may be undesirable to expose the elderly or those of poor physique to its added risk, quite apart from the lack of necessity for looking so far forward as to the five-year result in such cases. Nevertheless, even in these cases the inferior mesenteric artery can be divided just below the origin of the left colic artery without disturbing the patient any more than would a wedge resection of the mesentery.

Conclusions.

Malignant tumours of the left side of the colon are common; but the five-year results after removal are disappointing. In an appreciable number of cases this may be due to the performance of an operation that is too conservative in its removal of regional lymphatic nodes. A plea is made for the total removal of the inferior mesenteric artery with its closely related lymph nodes in selected cases of carcinoma of the sigmoid and descending colon and of the splenic flexure. This operation of left hemicolectomy can be accomplished without unduly disturbing the patient, whilst the resulting function of the bowel is quite normal.

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AN EPIDEMIC OF INFLUENZA TYPE B OCCURRING IN VICTORIA DURING 1953.

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TYPE B virus influenza has appeared in epidemic form in Melbourne during September, 1945 (Burnet, Stone and Anderson, 1946), during August, 1948 (Anderson, 1949), and during September, 1951 (Anderson *et alii*, 1953). We

report the occurrence of an outbreak of influenza type B in Melbourne during the period July to September, 1953. The virus strains isolated were homogeneous serologically, but could be distinguished from influenza B strains isolated during each of the previous epidemics.

Materials and Methods.

Technical procedures followed those previously described in earlier papers from these laboratories. Isolation of virus was attempted by inoculation of the amniotic cavity of thirteen day old chick embryos (Beveridge and Burnet, 1946) in the presence of penicillin and streptomycin. The throat washings, taken in saline and then mixed with beef heart infusion broth, were held at 4° C. until egg inoculations were performed, usually within three days, and never more than seven days after sampling. Influenza haemagglutinin in egg fluids was detected by the pattern test, chick and human red cells being used. Complement fixation tests followed the technique of Donnelly (1951), infected chick lung being used as antigen.

The following strains of influenza B virus were used:

- (i) Lee, isolated in 1940 (Francis, 1940); (ii) Mil B, isolated in 1945 (Burnet, Stone and Anderson, 1946); (iii) Sof B, isolated in 1951 (Anderson *et alii*, 1953).

Clinical Observations.

Clinical influenza occurred in Melbourne during July, August and September, 1953. Although the disease also occurred in older age groups, the impression was gained that the greatest incidence of the clinical disease was in people between the ages of ten and twenty-five years. Within these ages we studied groups of children in two boarding schools, trainee nurses in four public hospitals in Melbourne and patients in a sanatorium near Melbourne. One hundred and thirty-six clinical cases came to our notice in these seven centres. The weekly incidence rose from July 18, when three cases were reported, to a maximum of 40 cases during the week August 22 to 29. Thereafter there was a rapid decline, and no case was encountered after September 12, 1953 (see Table I).

TABLE I.
The Incidence of Clinical Influenza Cases.

Week Ending.	Number of Clinical Cases Examined.	Number Yielding Influenza Virus Type B.	Number of Cases Examined Serologically.	Number Showing Serological Evidence of Influenza Type B.
July 18	3	0	3	0
July 25	4	0	4	0
August 1	12	0	12	8
August 8	0	0	0	0
August 15	19	3	11	8
August 22	23	2	9	8
August 29	40	0	35	26
September 5 ..	28	1	25	17
September 12 ..	6	0	6	4
September 19 ..	0	0	0	0
September 26 ..	1	0	1	0
Total	136	6	106	71

The clinical picture in the 136 patients studied was not remarkable. Mild upper respiratory inflammation was accompanied by headache, backache and fever of only moderate severity. Nausea, abdominal pains and diarrhoea were not present. Recovery was uneventful, though occasionally prolonged into the second or even the third week. It is realized that this clinical description is not necessarily applicable to older age groups, in which, in fact, the mortality may be appreciable.

Laboratory Investigations.

From the 136 clinical cases, 106 serum pairs were examined; 71 (67%) of these patients developed complement-fixing and antihaemagglutinin antibody to

¹This work was supported in part by a grant from the National Health and Medical Research Council, Canberra.

type B virus; 35 (33%) did not develop either type of antibody.

A total of 84 patients provided throat washings which were examined for infective virus. Of the 84, 30 were not examined serologically. Four of these 30 washings yielded type B virus; strain B.Melb/4/53 was derived from one of these washings. Only two of the remaining 54 washings yielded virus, and these also were type B influenza. These two were grouped as follows: one "positive" washing was found among 23 patients who did not develop antibody after their clinical illness; the other washing, which yielded strain B.Melb/3/53, was from one of a group of 31 patients who did develop antibody subsequently.

There is, of course, no valid evidence in the group of 22 persons who did not develop influenza antibody that these patients did suffer from virus influenza. It is likely that a number did so, but failed to develop antibody. Probably this group also includes non-influenzal infections.

The low percentage of virus isolations is a most unusual finding. Only one strain was recovered from 31 serologically proven cases, and only six strains from 84 clinical cases in which washings were obtained. During investigations

TABLE II.
Serological Comparison (Antibody Titres) of Influenza Type B Strains.

Antihæmagglutinin. ¹	Strain of Virus Hæmagglutinin.			
	B.Melb/ 4/53.	Sof B (1951).	Mil B (1946).	Lee (1939).
Human sera: "acute" and three weeks con- valescent:				
COP	<10- 35	—	<10- 20	<10- 80
KEN	<10- 280	—	<10- 70	<10- 25
Ferret sera prepared against virus:				
B.Melb/4/53:				
(a)	<10- 60	<10- 30	<10- <10	<10- <10
(b)	<10- 100	<10- 35	<10- 35	<10- <10
Sof B:				
(a)	<10- 15	<10- 60	<10- 15	<10- <10
(b)	<10- <10	<10- 120	<10- 20	<10- <10
Mil B:				
(a)	<10- <10	<10- 30	<10- 60	<10- 20
(b)	<10- 25	<10- 40	<10- 400	<10- 60
Lee:				
(a)	<10- <10	<10- <10	<10- <10	<10- 240

¹ Sera treated with R.D.E. and heat to destroy non-specific inhibitors (Isaacs and Bozzo, 1951).

into sporadic influenza B cases in 1943, Beveridge, Burnet and Williams (1943) isolated virus from only one patient out of eleven who, on serological evidence, suffered influenza B infection. A previous study under circumstances similar to the present study (Anderson *et alii*, 1953) yielded an isolation rate of 40% in proven cases of influenza type A during an epidemic.

A later examination of first passage allantoic fluids threw some light on this low isolation rate for type B influenza in 1953. Allantoic fluid containing infective virus was preserved by the addition of glycerol (25% volume for volume). The infective titre after two days' storage at -20° C. was 2,000,000 per millilitre, and after twenty-three days at the same temperature was 200 per millilitre. This finding would indicate that early egg passage material of the current strains does not maintain titre when stored at -20° C. Samples of throat washings stored at 4° C. for several days between their being taken and the inoculation of eggs probably deteriorated in a similar manner.

The six type B strains isolated during this period were compared by antihæmagglutinin titrations, both human and ferret sera being used. We have taken B.Melb/4/53 as our reference strain for this group of six. The 1953 type B strains are homogeneous, but are distinct from Lee. A gradual antigenic drift can be discerned from Lee (1940) through Mil B (1945) and Sof B (1951) to B.Melb/4/53 (see Table II).

The breadth of serological response in individual patients was noted. Patient COP developed a similar (low titre) antibody level to all type B strains used in the tests, but KEN responded with antihæmagglutinins of a higher titre for B.Melb/4/53 (Table II) than for the other two viruses used. Of the 23 serum pairs so examined, 12 were of the completely broad type, four showed considerably higher titres for B.Melb/4/53 than for the other viruses, and 12 were intermediate in character. The group of patients with the broad antihæmagglutinin responses were of ages ranging from thirteen to thirty-one years, with an average of twenty years. The group with the narrow response were of the average age of fifteen years, with a range from thirteen to eighteen years. Although the figures are too few to be conclusive, they are consistent with the view reported in the case of type A influenza, that the antihæmagglutinin response in older persons occurs against a wider range of related viruses than is the case during adolescence (Burnet and Stone, 1946).

While this epidemic was being investigated, we received through the courtesy of Dr. I. M. Mackerras, Director of the Queensland Institute of Medical Research, sera from patients suffering from upper respiratory tract infection in Brisbane. Two of the four sera taken in Brisbane during October, 1953, showed a rise in antibody to influenza type B.

Discussion.

Other workers have reported the serological examination of type B influenza strains. Bozzo (1952), using ferret sera, found that the influenza B strains then available appeared to belong to two groups, as represented solely by Lee, and by a group including Mil B strains. He found no evidence that a periodic variation, similar to that described for influenza A, occurred with type B strains. Bozzo suggested that all the type B strains which had been maintained only in egg passage were more or less of the same group, and that it was only the ferret-passaged, Lee strain which could be readily distinguished as a second group.

Hillemann, Mason and Buescher (1950), using rooster sera after intraperitoneal and intravenous inoculation, divided influenza B into three general groups represented by Lee (1940), Hawaii (1945) and Warner isolated in Melbourne in 1948. Tamm, Kilbourne and Horsfall (1950) examined type B strains isolated since 1945 through 1950. They concluded that the antigenic dissimilarities between type B strains were as wide as those between type A strains. Jordan and Gaylin (1953) also emphasized the heterogeneity of influenza B strains isolated in different epidemics since 1940.

The results presented in this paper provide further evidence of what Burnet (1953) has termed an "immunological drift". The 1953 Melbourne strains represent a further step in the serological progress of type B influenza virus. Strains isolated from any one epidemic may be homogeneous, but between representative strains of two consecutive epidemics there are minor though definite serological differences. There has been little or no evidence of a reversion of serology to earlier types, and to this extent we believe the secular change in the type B antigenic patterns to be unidirectional.

The situation is closely analogous to that described for type A virus (Anderson, 1948; Taylor, 1949; Hillemann, Mason and Buescher, 1950; Isaacs, Gledhill and Andrewes, 1952).

We agree with Taylor (1949) that the most likely explanation of this type of unidirectional change is the spread of influenza virus in a population which retains some immunity to earlier antigenic patterns. In such a partially immune human population antigenic mutants would more readily survive and initiate an epidemic. Reversion to former antigenic patterns is prevented by residual antibody in the population.

Summary.

An epidemic of type B influenza occurred in Victoria during August and September, 1953. Only one throat washing from 31 serologically proven cases yielded virus,

although five other strains of type B virus were isolated during the epidemic. The six strains which were recovered were serologically distinct from previous type B strains.

The unidirectional change in antigenic pattern of type B influenza virus is analogous to the behaviour of type A virus. This "immunological drift" is discussed.

Early egg passage virus did not survive well at -20°C .

Acknowledgements.

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MODERN ANÆSTHESIA WITH RELATION TO GENERAL PRACTICE.¹

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As can be seen from the title of this paper, I am going to discuss modern anaesthesia with relation to general practice; so it is essential to have clear in our minds what we can regard as modern anaesthesia. A glance at the index of a recent textbook on the subject answers this question, and we find that modern anaesthesia embraces the use of relatively new drugs such as the thio-barbiturates, muscle relaxants and trichlorethylene, gases such as cyclopropane, apparatus such as the Magill tube and modern gas anaesthetic machines, and techniques such as controlled

respiration. This list is not necessarily complete, because it should include hypothermia and controlled hypotension in the category of techniques, but I mention these only to dismiss them as inapplicable to general practice surgery.

It is advisable to consider the nature of surgery performed by general practitioners in Australia. I make a point of saying "in Australia", because conditions of life are so different here from those in England that the general practitioner here is expected to be far more ambitious in the extent of his surgical practice than his English counterpart; this has for many years been necessitated by the huge distances between small towns here rendering self-reliance imperative, whereas in England all distances to surgical centres are small, and latterly the introduction of a National Health Service in England has curtailed severely the extent of general practitioner surgery.

Perhaps we could review the surgery performed by general practitioners under the following headings: (i) acute surgery, (ii) traumatic surgery, (iii) elective surgery; and these groups in turn must be amplified.

(i) In acute surgery we have surgery for acute intestinal obstructions resulting from adhesions, strangulated hernia, carcinoma, volvulus *et cetera*; for peritonitis from perforated ulcer, ruptured appendix *et cetera*; for acute paediatric conditions, such as intussusception and volvulus; for acute ear, nose and throat conditions, such as retropharyngeal abscess; and for gynaecological emergencies, such as ruptured ectopic pregnancy, ruptured ovarian cyst, Cæsarean section and perforated uterus.

(ii) In traumatic surgery we have surgery for any injury, be it a kick from a horse rupturing the liver, an accidental gunshot wound, injury in road accidents or one of a long list of injuries which could necessitate immediate laparotomy or simple suture of wounds.

(iii) In elective surgery we can include exploratory laparotomy, perhaps leading to a colostomy preparatory to gut resection, cholecystectomy, hysterectomy, Cæsarean section, and not least in frequency, adult tonsillectomy and multiple extractions of teeth.

This list could go on and on, but I have cast my mind on surgery commonly performed by many general practitioners, and as you see, already the list is formidable.

Modern Anaesthesia.

How does modern anaesthesia link up with this work? For many years past "open ether" anaesthesia, spinal anaesthesia or local analgesia has made this surgery possible. There is still an enormous field of surgery in which these time-honoured methods of anaesthesia are excellent, have the virtue of simplicity, and are conducted in many cases very skillfully by general practitioners. In thinking over this list of surgical procedures I have had in mind the fact that they could be better performed, and with greater benefit to the patient, if modern anaesthesia was used. Inevitably modern anaesthesia tends to introduce more complicated techniques and apparatus, so much so that a specialist in anaesthesia is needed to administer the anaesthetic. However, in these days many general practitioners learn quite a lot about modern anaesthesia and are proficient in the use of intravenous anaesthetic and intratracheal ether techniques, much to the benefit of the patient. The specialist anaesthetist necessarily works in the larger cities, where there are big hospitals and specialist surgeons performing major surgery of a type beyond the scope of the average general practitioner, such as intrathoracic work, gastric surgery, neurosurgery, genito-urinary surgery and so on. But in spite of this, the specialist anaesthetist gives many anaesthetics for general practitioner surgeons. Why? Because, using modern methods with a skill born of great practice, he can produce ideal working conditions for the operator, the like of which were unknown only eight years ago, when "open" ether and spinal and local anaesthetics were virtually the only anaesthetics used here in Queensland; as for the patient, he has a rapid, peaceful induction of anaesthesia with no unpleasant sensations or memories, usually from an intravenous injection, he awakens later in bed, not vomiting

¹ Read at a meeting of the Queensland Branch of the British Medical Association on April 21, 1954.

and rarely even nauseated, the operation completed, and the anaesthetic mortality and morbidity are negligible in direct ratio to the skill of the anaesthetist.

I will elaborate on some of the features of the modern techniques and drugs already alluded to.

Thiobarbiturates.

The thiobarbiturate most commonly used is soluble thiopentone, such as "Intraval Sodium" and "Pentothal Sodium", the latter being introduced by Lundy in America in 1934. It rapidly supplanted "Evipan Sodium"; and in spite of rivals which have appeared since, such as "Kemithal", it has swept the market and has held its position as the most satisfactory intravenous anaesthetic agent for just twenty years.

The indications for using soluble thiopentone are innumerable, but its most popular uses are for induction of anaesthesia which is to be maintained by another agent, for short operations, for providing narcosis when spinal or regional analgesia is being used, and to provide anaesthesia free from the risk of explosion when a cautery is being used. The ease and rapidity of induction and the freedom from post-anaesthetic vomiting when thiopentone has been used are household words nowadays among the public as well as the doctors, so that patients very frequently request this form of anaesthesia. Naturally there are many disadvantages, such as respiratory and circulatory depression, especially in ill patients, and laryngeal spasm is apt to occur; then serious accidents such as intra-arterial injection may happen (more of these later), but generally speaking soluble thiopentone is truly a wonder drug.

Muscle Relaxants.

Since the introduction of curare preparations by Griffiths and Johnson in 1942 in Canada, many relaxants have appeared, and today those most commonly used are "Tubarine", gallamine triethiodide or "Flaxedil", and succinyl choline chloride or "Scoline". The first two make possible any degree of muscle relaxation with light anaesthesia, facilitate intubation of the trachea, bronchoscopy and oesophagoscopy, facilitate controlled respiration, nullify laryngeal spasm, and so on; "Scoline", however, is very short acting, and is of particular value in any procedure in which profound relaxation is needed for no longer than three minutes with a single dose. The action of "Tubarine" and "Flaxedil" is reversed rapidly by "Prostigmin", whereas "Scoline" needs no reversal as its action is so short. But no drug is perfect, and occasional cases have been reported of unduly prolonged relaxation with all three of these drugs. This is one of the reasons why the means of controlling respiration must always be at hand and the technique understood whenever relaxants are used.

Trichlorethylene.

Trichlorethylene or "Trilene" I mention because, although it has been known in industry for many years as a grease solvent, only as recently as 1941 was it introduced as an anaesthetic agent in England by Langton Hewer and Hadfield. In Queensland "Trilene" is used mostly in midwifery as an analgesic, as an alternative to the use of nitrous oxide and air, but its non-inflammable and non-explosive qualities when mixed with air make it useful for providing light anaesthesia especially where a cautery is to be used—for example, in the nose. Smokers may take heed, however, that "Trilene" vapour inhaled through a lighted cigarette is broken down into toxic products which include phosgene; this is dangerous to the smoker but to no one else. I will make no further comment on "Trilene", as it is relatively unpopular as an anaesthetic in Queensland.

Cyclopropane Gas.

Cyclopropane was first used as an anaesthetic in 1923. It is much more powerful than nitrous oxide and must therefore be used with high concentrations of oxygen, the oxygen proportion in a closed circuit being anything from 60% to 90%. These properties, together with the fact that it does not materially irritate the bronchial tree and does

not cause liver or kidney damage, made it a very popular anaesthetic agent especially for cardiac subjects, for very ill patients, and in intrathoracic surgery; but since the advent of the relaxants cyclopropane has been used less and less, being supplanted by nitrous oxide with relaxants and minimal amounts of thiopentone sodium. Moreover, cyclopropane is highly explosive, which makes its use impossible when diathermy is being used, as in thoracic surgery. However, I still use it occasionally, especially for Caesarean sections, as its elimination from the body is so rapid, perhaps taking four or five minutes, and it provides adequate relaxation for this operation. More of this later.

The Intratracheal Tube or Magill Tube.

The intratracheal tube was introduced in England by Magill and Rowbotham about 1921, and marks one of the most outstanding advances in anaesthesia. There is no need to describe this tube, as you all know it, but I will remind you that it occupies the whole space between the vocal cords, so that breathing through it is to-and-fro in character as in the trachea itself; it is, in fact, an extension of the trachea which can be connected with an anaesthetic machine. The greatest advantage of the Magill tube is that it provides a perfect airway with consequent absence of laboured respiration and capillary oozing; at the same time the bronchial tree is completely protected from the aspiration of mucus, blood, or any foreign material, especially if a cuffed tube is used; connecting the tube to an anaesthetic machine makes it possible for the anaesthetist to work in a position remote from the patient's head, leaving this area free for the surgeon if he so desires; control of respiration is perfect, being completely in the hands of the anaesthetist. Intratracheal anaesthesia is particularly valuable in upper abdominal surgery, providing smooth and quiet anaesthesia which may be impossible to obtain with "open" ether alone; the mere insertion of a Magill tube, even though "open" ether administration is continued over this form of airway, alters the whole character of the anaesthetic, making it a joy to anaesthetist and surgeon alike, whereas previously the whole team was struggling. This has to be experienced to be believed. The advantages of intratracheal anaesthesia for surgery of the head and neck and for major dental surgery are obvious, and intrathoracic surgery is almost impossible without it.

Modern Gas Anaesthetic Machines.

Modern gas anaesthetic machines make it possible to administer gases such as nitrous oxide, cyclopropane and oxygen in suitable proportions accurately measured by flowmeters, while provision is made for the addition of ether into the circuit, and in some machines for that of trichlorethylene as well. These machines incorporate a soda-lime canister for the absorption of carbon dioxide so that the closed circuit is generally used; but remember that trichlorethylene must never be used in a closed circuit, as the heat generated in the soda-lime during carbon dioxide absorption gives rise to poisonous breakdown products of "Trilene". A closed circuit conserves body heat and moisture which would normally be lost from the lungs into the atmosphere, and materially assists in maintaining the patient in good condition, particularly in a long operation. Also, when a closed circuit is used, the quantities of oxygen and anaesthetic agents used are ridiculously small. Oxygen may be used at the rate of perhaps only 200 cubic centimetres per minute, and ether used is measured in drachms instead of ounces; in fact, in a hot climate such as that of Brisbane an anaesthetist might have to use 20 times more ether by the open mask technique for a given time and operation than he would use in a closed circuit; the atmospheric temperature just does not matter.

All controlled respiration anaesthesia is accomplished with one of these machines, the value of which to modern surgery cannot be over-estimated.

Controlled Respiration.

Controlled respiration is exactly what the name implies—the respiration of the patient is controlled by the anaes-

thetist. Intrathoracic surgery is impossible without it, and whereas upper abdominal surgery may be possible without it, it is far easier with it, as the smooth, quiet movements of the diaphragm and complete absence of straining on the part of the patient simplify surgery enormously. Before the advent of muscle relaxants controlled respiration was achieved by first depressing the patient's respiratory centre with large doses of morphine, and then washing out the carbon dioxide from the lungs by hyperventilation by rhythmic compression of the rubber bag on the anaesthetic machine; stimuli to natural breathing were thus removed, and were it not for the artificial respiration by the anaesthetist the patient would be asphyxiated; natural breathing was resumed only after hyperventilation had been gradually discontinued, and a normal rate of breathing recurred only as the depressant effect of the morphine wore off. The method now used is to paralyse the patient with a relaxant after induction of anaesthesia with thiopentone sodium, and then to continue artificial respiration with oxygen and the anaesthetic gas. If paralysis includes the diaphragm as well as the skeletal muscles, then the control of respiration is complete; but if, as often happens, it is unnecessary to paralyse the diaphragm as well, then this muscle still retains some function and respiration is only assisted by the anaesthetist—in other words, control is only partial.

Comment.

This gives you some idea of what is meant by modern anaesthesia. Apart from endeavouring to provide the most suitable anaesthesia for every form of surgery, the great aim of modern anaesthesia is to harm the patient as little as possible with the anaesthetic. Whatever anaesthetic agent is used, the patient is very lightly anaesthetized, being maintained in Stage III, lower plane 1 or upper plane 2, for those who remember the Guedel classification of the clinical signs of ether anaesthesia; relaxation is obtained not by deep anaesthesia but by the use of relaxant drugs. It is prolonged deep anaesthesia which will harm the patient. The more skilful the anaesthetist, the less the anaesthetic risk to the patient, no matter what anaesthetic agent is used.

I was asked to discuss the use of modern anaesthesia in connexion with certain specific forms of surgery—namely, Caesarean section, minor dental surgery and the operation of tonsillectomy in children, so I will comment on these subjects.

Caesarean Section.

The technique for Caesarean section which I usually employ is as follows.

1. Prepare the patient psychologically by explaining what you will do (for example, intravenous injection in the operating theatre, all being for the good of the baby). Be very kind to the patient and exude quiet confidence in a successful outcome, and order a sedative such as "Nembutal" the night before.
2. Premedicate the patient with atropine, 1/150 grain, one hour before. Do not give a sedative.
3. Have the patient on the table in the operating theatre, draped and with the skin prepared, the surgeon gloved and gowned and ready.
4. Have the sucker at hand, working, and a theatre orderly ready to put the table into a Trendelenburg position if requested. The anaesthetic machine and intravenous syringe are ready.
5. Induce light anaesthesia with 0.25 to 0.5 grammes of thiopentone sodium given intravenously, injected slowly so that there is never an apnoeic phase.
6. Use no pharyngeal airway; but if the patient is edentulous arrange beforehand that she keep her dentures in.
7. Immediately the patient is soundly asleep apply the face mask and administer cyclopropane (40%) with oxygen (60%) for about two minutes; then request the surgeon to start. It is better if the surgeon spends as little time as possible in haemostasis, but hastens to deliver the baby.

8. The baby is delivered a very few minutes after the commencement of induction of anaesthesia and cries immediately.

9. By now anaesthesia has been stabilized with a much smaller flow of cyclopropane, and the surgeon is concerned with haemostasis and the removal of the placenta.

10. For the completion of the operation I sometimes continue with cyclopropane, or as an alternative introduce a little ether.

Now to explain this procedure.

The sedative one hour before the operation is avoided to prevent any possibility of depression of the infant's respiration.

All preparations are completed before anaesthesia is induced, so that the duration of anaesthesia is as short as possible before the delivery, again to avoid depression of the infant's respiration.

The theatre orderly and the sucker are ready in case the patient should vomit during the induction; but unless the Caesarean section is performed in a desperate emergency, this very rarely occurs. If there is any reason to think that there is food in the patient's stomach, it is safer to empty it beforehand with a large stomach tube.

Refrain from using an airway before delivery to avoid the possibility of laryngeal spasm occurring under the light anaesthesia, and leave full dentures in place to facilitate a gas-tight fit of the rubber mask on the face.

Some anaesthetists use a little "Flaxedil" to assist relaxation and to reduce the quantity of anaesthetic agent used. I consider this unnecessary, because the abdomen is so stretched that once the baby is delivered the muscles are completely loose; the patient is only very lightly anaesthetized before delivery, and the depth of anaesthesia after delivery is not of such great importance. The lower segment Caesarean section takes much longer than the classical upper segment operation; but this does not materially modify the anaesthetic technique.

The surgeon has blood grouped and ready if necessary, but I disagree strongly with the anaesthetist's being asked to set up a blood transfusion; the anaesthetic is a full-time responsibility.

Minor Dental Surgery.

Commenting on modern anaesthesia for minor dental surgery, I will confine my remarks to the use of intravenous anaesthesia, which in these days is so often given in the dentist's surgery, the patient either sitting up or lying down. Somebody once said that "Pentothal" is fatally easy to give". How true! Let me quote some statistics on mortality from Hewer's "Recent Advances in Anaesthesia and Analgesia". Several series of fatalities with intravenous anaesthesia have been investigated; the earlier series involved the use of "Evipan Sodium", but the most recent, in which thiopentone sodium was used, and which was published in Melbourne in 1942, recorded a mortality rate of 0.14%, the same as the earlier figures.

Do you realize that a death rate of nearly three in 2000 puts thiopentone next to chloroform in danger?

Hewer goes on to comment that the deaths were probably due to "faulty technique, to disregard of known contraindications and to the missing of severe laryngeal spasm until too late". Maybe so; but how essential it is to know all that there is to be known about intravenous anaesthetics and to be prepared to deal with any complications.

Do you have an efficient sucker at hand every time you use thiopentone sodium?

Do you have at hand the means of inflating your patient's lungs with oxygen, of intubating the patient's trachea and of controlling respiration after giving an urgent dose of a relaxant to break laryngeal spasm, every time you administer an intravenous anaesthetic?

These are only some of the safety questions you may well ask yourselves.

The worst that can happen is death; but inadvertent injection of thiopentone into an artery can have most

serious consequences. Many cases have been reported, so that the incidence in Great Britain has been estimated at one in 55,000 injections. Intense vasospasm and thrombosis in the artery occur, followed by gangrene of the fingers. Hewer quotes a series of eight cases, five of the patients subsequently undergoing amputation through the arm or forearm. The accident may be recognized by the patient's feeling a severe burning pain down the arm and hand. Loss of consciousness is slower than with intravenous injections. The treatment of the accident today is as follows:

1. As a prophylactic measure, never let the tourniquet occlude the artery, and always palpate the site of injection for pulsation before injecting. After injecting a few minims always stop and ask the patient if it hurts; if he says "yes", then ask "where"; usually he says that it hurts at the point of the needle, but he may report pain down the arm and hand.

2. If it is certain that several cubic centimetres of solution have entered the artery, then abandon the operation.

3. Perform brachial plexus block with a long-acting analgesic drug—for example, amethocaine—to produce vasodilatation in the limb.

4. Inject 15,000 units of heparin into the artery.

5. Later carry out anticoagulant treatment with dicoumarin.

6. Watch the limb carefully for six hours, as a decision to explore the artery must be reached within this time.

7. If it is decided to explore the artery, then open it proximal to the site of injection and remove the clot.

8. Inject heparin into the distal part of the artery before closing it.

9. Wrap the limb in a sterile towel and cotton-wool, but do not heat it.

I will say no more about thiopentone sodium, as I feel that already I have given food for thought.

Tonsillectomy in Children.

I do not wish to relate modern anaesthesia to the operation of tonsillectomy in children, apart from mentioning that Leigh and Belton, of the Vancouver General Hospital, Canada, quote the routine use of intratracheal anaesthesia for tonsillectomies in their paediatric section. However, before leaving this subject I should like to stress the importance of adequate premedication of the child. Too often does one hear the shrieks of a terrified child being smothered with ethyl chloride, before he undergoes tonsillectomy. The psychological trauma of this episode must be profound, and probably it contributes in so small measure to the adult later on being more frightened of the impending anaesthetic than of the operation, maybe when having a gall-bladder removed. Sound premedication is to give the child "Nembutal" the night before operation and again two hours before the anaesthetic, followed by atropine one hour before. The "Nembutal" dosage may be based on body weight, one-half grain per stone being given, with three grains as a maximum. The powder can be emptied from the capsule and mixed with honey or a sweet drink, or "Nembutal Elixir" may be used if the child will not swallow the capsule.

How much more pleasant for everybody it is to have the child brought into the operating theatre asleep, only to stir slightly as the ethyl chloride is sprayed on. The child's amnesia after this procedure is perfect.

Conclusion.

Finally, when should a general practitioner surgeon call in a specialist anaesthetist? The answer is simple. You always do your best for your patient, and the gravest anaesthetic risks are with the very young, the very old, and the very ill.

PROPHYLACTIC ANTIBACTERIAL TREATMENT IN THE PREVENTION OF CONTAGIOUS ENTERITIS IN CHILDREN'S HOMES

By E. SINGER,

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In four outbreaks which could be studied in the years from 1949 to 1951, it was found that adults were the dangerous spreaders of enteritis in institutions which care for young children, and this seemed to be the predominant single epidemiological factor (Singer and Ludford, 1953). In most instances unqualified personnel or nursing trainees were implicated, whereas trained nurses, although they became infected occasionally, did not often spread the infection.

The studies were continued for another year and a further seven outbreaks in institutions were observed. Four of these were apparently caused by members of the staff, one was caused by a four-year-old child who had free access to the infants, a long drawn-out endemic was traced to grossly unhygienic practices, and in only one could no definite epidemiological features be discovered.

These observations confirmed the predominance of the infected person over purely mechanical transfer of the infectious agency by accidentally soiled hands, dust or similar vehicles. However, it was thought that such ways of transfer might contribute to the spread of the infection once it had been introduced, particularly in institutions which care for children of older age groups, as toddlers can easily exchange infections or transmit them to infants in the same institution.

Early antibacterial treatment was tested in an attempt to restrict these secondary pathways of infection. This was applied purely from the preventive point of view, even when the clinical condition of the infected child gave no indication for the administration of antibacterial drugs.

Two methods seemed possible. (i) By treating immediately every child who was found to be infected, whether the clinical condition made this advisable or not, it was hoped, by shortening the period of contagiousness, to prevent a certain amount of spread by direct contact, and, by restricting the number of pathogenic organisms which were excreted, to lessen contamination of bedding, utensils and rooms, and thus reduce the chances of indirect contact. (ii) The other method consisted, in addition to the measures outlined in the first method, in a prophylactic treatment of the whole group at risk, as soon as it was recognized that an infection showed signs of spreading. It was hoped to cut short incipient and asymptomatic infections by giving all children a short course of antibacterial treatment.

Each of these measures was adopted by one institution, whilst in a third, which was used as a control, children were treated only when their clinical condition made the administration of bactericidal drugs advisable.

Methods.

Antibiotics were used in this study, because in our experience even patients with severe enteritis responded well to this treatment (Fison and Singer, 1950), whereas the effect of sulphonamides tended to be disappointing. After preliminary trials the following treatment schedules were decided upon.

In infections with *Shigella sonnei* and *Escherichia coli* O111 and O55, chloramphenicol was given in a dosage of 50 milligrammes per kilogram of weight per day for seventy-two hours. No treatment was given for two to three days, and then a bacteriological examination was followed by the administration of sulphadiazine, two to four tablets per day for three days. Alternatively, aureomycin was given in a dosage of 10 to 15 milligrammes per kilogram of weight per day. Other details of treatment were as outlined above. If pathogenic organisms were still present after these treatments, the course was repeated, double the amount of antibiotic being adminis-

tered for five days. Other details were identical. From July, 1952, onwards, only aureomycin was used for repeated treatments.

In infections with *Salmonella* only the intensive five-day course of treatment was used.

Prophylactic Measures.

As a prophylactic measure, antibiotic only was administered for one to two days in the dosage set out above.

Other restrictive measures were used as indicated. Infected adults were isolated and treated. They were not allowed to come in contact with children until free of pathogenic organisms. Infected children, whether patients or carriers, were isolated in separate rooms, and special staff was detailed to care for them.

All homes were visited at least once every week, and cultures were made from rectal swabs of all newly admitted children, and of all children who had either shown signs of gastric upset during the preceding week or had been found infected at a previous visit. Frequent checks were made of children who stayed in the home for a longer time.

If infections occurred in the home, more visits were made and the staff was encouraged to send in additional specimens whenever this was thought necessary. The staff members were instructed in the correct method of swabbing and plating, and most of them became very proficient in these simple techniques.

Specimens from adults were collected in closed glass containers and examined within two hours. At least one specimen per month was requested from members of the nursing and domestic staffs, and as a rule this was provided. In addition, the staff members were asked to furnish specimens whenever they suffered from indigestion, however slight; but the response to this request was poor.

The Homes Investigated.

All institutions which were chosen for the trials admitted children of all ages, but had separate houses for infants. The characteristics of the institutions were as follows.

Home A.

In this home the treatment of all infected children was undertaken, together with prophylactic treatment of the whole group at risk. The average population of children aged under two years was 38.

Children aged from two to five years were housed in a wing of the infants' home, and kitchen facilities were in common. A certain amount of direct contact occurred, as a few toddlers to whom the staff became attached were allowed to enter the area reserved for infants and to play with them. Separation from children of school age was absolute; contact with persons outside the institution (including the parents of the children) was rigorously restricted.

Home B.

In this home the individual treatment of all infected children was undertaken; there was no group treatment. The average infant population was 20. The physical separation of the infants was absolute, and separate kitchen facilities existed, although the milk kitchen was in open communication with the main kitchen and a certain interchange of domestic staff occurred. However, the home was used as a nursing school and the nursing trainees were changed in fortnightly intervals between the infants' home and the house for the older children. The institution accepted mothers together with their babies and was open to visitors, and the mothers were allowed to leave without restrictions being imposed about contacts, meals in town, or food being brought back into the home.

Home C.

In the third home no treatment was given except when indicated by the child's clinical condition. The average population of infants was 25. The physical separation of the infants was absolute, but all food, except the bottles of

milk mixture for the very young, was prepared in a central kitchen. Domestic staff worked in all houses indiscriminately, and the infants' nurses had to work in the houses for the older children when difficulties in staffing occurred.

Results.

The epidemiological observations in Home A are summarized in Figure 1. When visits to the home began in March, 1951, an epidemic of dysentery caused by *Sh. sonnei* was at its height in Brisbane and the infection was endemic in the institution. Numerous children had to be sent to hospital, and although none of them became desperately ill, thanks to early treatment with antibiotics, a great number still excreted *Sh. sonnei* on their return.

During the first three months the infection was contracted in the home in 15 cases, although children on their return from hospital were isolated, and sent back to the hospital if they were found infected.

Search for carriers among the children between December 12, 1951, and January 7, 1952, proved fruitless, and sporadic cases and small outbreaks continued to appear.

Under these circumstances antibiotic prophylaxis was instituted on March 21, 1951; but although the two weeks immediately after the first mass treatment were free from new cases, the endemic reappeared, and sporadic cases continued to occur for another two months.

As no fresh introduction occurred in this time, it must be assumed that foci of infection persisted within the home and that the attempt at chemoprophylaxis had been unsuccessful. However, it is remarkable that only one child had to be sent to hospital during this time, although ten became infected. It is very likely that early treatment of all infected children prevented serious illness in many instances and made it possible to nurse in the institution children who otherwise would have had to be sent to hospital.

It seems possible that prompt treatment of all infected children contributed to the gradual disappearance of *Sh. sonnei* from the home; but the severity of the epidemic was declining at about this time, so it is difficult to judge how much of the decline can be attributed to the treatment and how much was part of the general phenomenon.

From June 16, 1952, to August 11, 1952, no locally acquired cases of enteritis occurred, with the possible exception of that of a child who was examined on July 10, 1952, three days after his admission, and was found to be infected with *Sh. sonnei*.

On July 28, 1952, a child who had been in hospital with non-enteric disease, was found to carry *E. coli* O 111 when examined on his readmission. The epidemic which developed followed the usual pattern. After prompt cure of the original carrier by treatment with chloramphenicol and two weeks' freedom from infection, ten children were found to be infected in surveys on August 18 and 20. Finally, the infection was traced to the wardmaid who had been assigned to care for the carrier while he was in isolation and who returned to general duties after the carrier was released from isolation on August 12.

Suppressive treatment was given on August 21.

A complete survey on August 25, four days after suppressive treatment and two days after the conclusion of curative treatments, disclosed one carrier whose infection had proved resistant. On September 1 a child returned to the institution after an absence of eleven days and also was found to carry the organism. However, with successful treatment of these two children and isolation and treatment of the infected wardmaid the outbreak was suppressed.

That this treatment contributed to the restriction of spread seems possible but somewhat doubtful, as in at least one instance the infection persisted.

This carrier could have formed the focus for a new flare-up, which would have appeared as a continuance of the original outbreak. Actually, the epidemiological observations in this case would have been very similar to those made previously during the endemic of *Sh. sonnei*.

infections in the same home. It seems to us of much greater importance that, simultaneously with the prophylactic treatment, the main source of infection was found and neutralized.

It is interesting to compare this outbreak with a similar epidemic which occurred at the same time in Home C, in which no prophylactic treatment was practised. The details are set out in the appendix.

The children in Home C were, on the average, younger than those in Home A, and the picture was further complicated by the simultaneous occurrence of *Sh. sonnei* infections. As can be seen from Table I, the outstanding difference between the two epidemics is the heavier rate of infection in Home C, in which 81% of all children became infected, whereas in Home A only 31% contracted the infection. At first glance this could be ascribed to the

impression was gained that, although prophylactic measures might have failed to restrict the spread of infection, they were instrumental in preventing serious sickness in Home A and were mainly responsible for the fact that none of the children had to be sent to hospital.

That prophylactic measures alone are not able to suppress an outbreak was shown by a second epidemic caused by *E. coli* O111, which occurred in Home A between December 22, 1952, and February 9, 1953 (see Figure I). In this instance the infection was probably spread from child to child, as no indication of infection of adults could be discovered, and there was no clear interval between the admission of the child with the original infection on December 22 and the child with the first autochthonous infection on December 29. It is quite obvious that neither the treatment with aureomycin on December

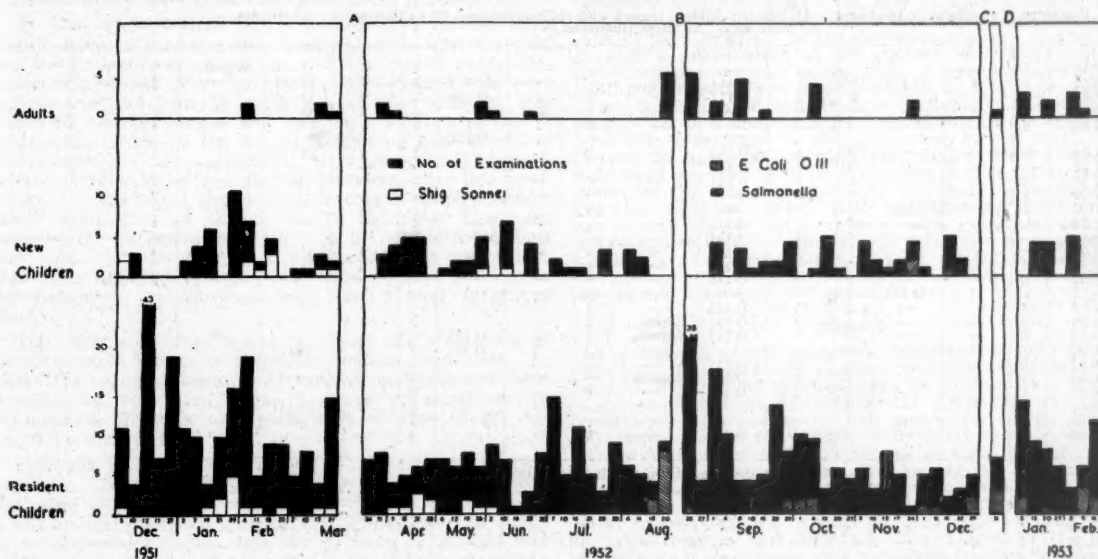


FIGURE I.

A, first preventive treatment; B, second preventive treatment; C, third preventive treatment; D, all children received two tablets of sulphadiazine for two days.

lack of prophylactic treatment in Home C, which allowed spread by direct and indirect contact to a much greater extent than in Home A.

Unfortunately this simple explanation cannot be accepted, as the rate of infection amongst the staff was much higher in Home C than in Home A, and the infected nurses and domestics, who stopped work only after their infections had been discovered by bacteriological examination, must have been extremely efficient spreaders of their respective infections.

It could be argued that immediate treatment of the infected children might have prevented spread from the children to the staff and thus prevented the broadcasting of the pathogenic organisms by the latter. This, however, is just what the preventive treatment in Home A failed to achieve, as the wardmaid was infected by the carrier despite early and effective treatment of the latter. Furthermore, it is more likely that the infection in Home C originated amongst the staff and only later spread to the children.

The heavy rate of infection with *E. coli* O111 in the staff of Home C is interesting. This seems to be at variance with the experience in England, where infections of adults are reported to be rare.

It is certainly not permissible to use the figures in the two homes for a direct comparison; but the definite

30 nor the treatment with sulphadiazine interfered seriously with the spread of infection.

These observations were confirmed by the experience in Home B, in which the attempt was made to eradicate an endemic by early treatment of all infected children without treating the whole group (Table I). The home was originally visited to find the cause for an outbreak of *Sh. sonnei* dysentery which was described in a previous paper. After the two nurses who originated this outbreak had been discovered and treated (June 2, 1952) no further cases of dysentery occurred in the home, with the exception of one in a child who entered the institution on July 2.

However, an infant was admitted to the home on June 2 carrying *E. coli* O111, which spread within one week to another infant in the same house, and within three weeks to the house for the older children. As the nursing trainees were exchanged between the houses on a regular fortnightly roster, it seems likely that the infection was transferred by one of the nursing pupils, although she was not discovered by our examination.

The endemic smouldered on for a full four months. One or two new cases occurred almost every week, although the infected children were isolated and promptly treated. It seemed impossible to discover the way of transfer and to prevent new infections, which, in almost

TABLE I.
Failure of Antibiotic Treatment to Prevent Spread of Infection (Home E).

Date.	Infants (Aged Two Weeks to Seven Months).							Older Children (Aged Seven Months to Six Years).							Adults.		
	First Examination.			Resident Children.				First Examination.			Resident Children.						
	Number.	Positive Findings.	Organism. ¹	Number.	Positive Findings.	Organism.	Remarks.	Number.	Positive Findings.	Organism.	Number.	Positive Findings.	Organism.	Remarks.	Number.	Positive Findings.	Organism.
27. 5.52	2	—	—	—	—	—	—	—	—	—	—	—	—	—	19	2	So
28. 5.52	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—
29. 5.52	1	—	—	—	—	—	—	6	—	O 55	—	—	—	—	—	—	—
2. 6.52	1	1	O 111	—	—	—	—	—	—	—	—	—	—	—	1	1	So
10. 6.52	1	—	O 55	1	1	O 111	—	—	—	—	3	2	O 55	Repeat. ²	—	—	—

Beginning of prophylactic treatment. All infected children treated with chloramphenicol, 50 milligrammes per kilogram, for three days. No mass treatment.

17. 6.52	1	—	—	1	—	—	—	—	—	—	1	1	O 55	Repeat.	1	—	—
23. 6.52	3	1	O 111	2	1	O 111	—	—	—	—	2	1	O 111	—	9	—	—
26. 6.52	—	—	—	2	2	O 111	—	2	1	O 55	2	1	O 55	—	5	—	—
27. 6.52	—	—	—	—	—	—	—	1	—	—	5	1	O 55	—	4	—	—
2. 7.52	2	—	—	8	—	—	—	2	1	So	1	—	—	—	—	—	—
7. 7.52	—	—	—	—	—	—	—	—	—	O 111	—	—	—	—	—	—	—
11. 7.52	2	—	—	3	1	O 111	—	1	—	—	1	1	O 111	—	4	—	—
14. 7.52	—	—	—	2	1	O 111	—	—	—	—	2	—	—	—	2	—	—
21. 7.52	4	—	—	2	—	—	—	—	—	—	1	—	—	—	2	—	—
24. 7.52	2	—	—	—	—	—	—	8	—	—	—	—	—	—	—	—	—
4. 8.52	—	—	—	5	1	O 111	—	—	—	—	5	—	—	—	4	—	—
7. 8.52	—	—	—	1	1	O 111	—	—	—	—	5	—	—	—	—	—	—
10. 8.52	—	—	—	1	1	O 111	—	—	—	—	6	1	O 111	—	4	—	—
18. 8.52	3	—	—	5	1	O 111	—	4	1	O 55	5	1	O 111	—	—	—	—
25. 8.52	6	—	—	2	1	O 111	—	—	—	—	7	—	—	—	3	—	—
26. 8.52	1	1	O 111	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1. 9.52	3	—	—	1	1	O 111	—	1	—	—	—	—	—	—	—	—	—
8. 9.52	3	—	—	1	1	O 111	Repeat.	2	—	—	2	—	—	—	—	—	—
15. 9.52	3	—	—	5	1	O 111	Repeat.	1	1	O 111	—	—	—	—	3	—	—
22. 9.52	—	—	—	2	—	—	—	1	1	O 111	5	1	O 111	—	1	—	—
29. 9.52	3	—	—	8	2	O 111	—	—	—	—	—	—	—	—	—	—	—
6.10.52	2	—	—	4	1	O 111	Repeat.	—	—	—	3	—	—	—	4	—	—
13.10.52	1	—	—	4	1	O 111	—	6	—	—	—	—	—	—	8	—	—
20.10.52	1	—	—	2	—	—	—	—	—	—	2	—	O 111	—	3	—	—
23.10.52	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
27.10.52	3	—	—	3	1	O 111	—	2	—	—	4	—	—	—	4	—	—

Rectal temperature taking discontinued.

3.11.52	2	—	—	2	2	O 111	—	1	—	—	2	—	—	—	1	—	—
10.11.52	2	—	—	—	—	—	—	2	—	—	3	—	—	—	7	—	—
17.11.52	3	—	—	—	—	—	—	3	—	—	—	—	—	—	3	—	—
27.11.52	4	—	—	2	—	—	—	2	—	—	—	—	—	—	3	—	—
1.12.52	1	—	—	1	—	—	—	2	—	—	3	—	—	—	—	—	—
8.12.52	3	—	—	3	1	Sal	—	1	—	—	3	—	—	—	—	—	—
16.12.52	2	—	—	2	1	Sal	Repeat.	6	—	—	1	—	—	—	—	—	—
23.12.52	1	—	—	1	—	—	—	4	—	—	—	—	—	—	—	—	—
29.12.52	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—

¹ O 111; *E. coli* O 111; O 55, *E. coli* O 55; So, *Sh. sonnei*; Sal, *S. typhimurium*.

² "Repeat", same child as in previous line.

all children, seemed to begin with symptoms indicating upper respiratory infection. Finally, the reason for this strange symptomatology and the endemic itself was discovered. It was found that the temperatures of children who showed minor symptoms of illness were taken rectally with a thermometer which was transferred from child to child after only superficial cleaning. This practice was abandoned on November 28, more thermometers were issued, these were thoroughly cleaned and disinfected after use, and the temperatures were taken in the axilla in older children and in the groin in infants. After this improvement had come into effect only two more cases of infection with *E. coli* O 111 occurred in the infants' home in the week immediately after the discontinuance of the rectal taking of temperatures, and the endemic which had been going on for many months was brought under control immediately.

There is little doubt that this simple measure achieved within a week what constant supervision of nursing technique, constant treatment with antibiotics and numerous examinations failed to achieve in a much longer period.

Discussion.

Although the three institutions which were chosen for the tests were very similar in nature, a great number of

variables sound a note of caution against too dogmatic an attitude. The number and age of the children, their nutritional condition, the after-effects of previous illnesses and numerous other factors would influence the natural resistance of the group. Strain-differences in the infecting organisms might introduce variations in infectivity, virulence or other factors which could change the response to prophylactic measures.

Last, but not least, the "human factor" plays a decisive role in institutions of this kind. Highly competent nursing sisters were in charge of all three; but difficulties in staffing were universal, and a large part of the work, even of responsible nature, had to be delegated at times to partly trained personnel. The efficiency and enthusiasm of the staff varied greatly, and so did smoothness of management and discipline. Prevention of an epidemic depends often on attention to details, and their observance on character and morale.

With these reservations in mind, the question whether chemoprophylaxis is an effective measure can be answered.

Our studies, which extend over almost two years, and which include treatment of the group at risk, complement and extend the scope of the short-term studies of Todd and Hall (1953) on the effect of antibiotic prophylaxis in individual cases. There is little doubt that it is possible

to prevent the development of serious symptoms by short treatment with antibiotics during the incubation period or in incipient cases.

The inconclusive results of prophylactic treatment in preventing spread of infection had to be expected. As treatment of the children could at best only block secondary pathways of transmission, a decisive effect could not be anticipated. In this respect our results are very similar to those which have been obtained by chemoprophylaxis in other contagious diseases; but even if it is assumed that prophylaxis has failed completely from an epidemiological point of view, the prevention of suffering by early treatment and the saving caused by obviating admission to hospital seem very worth while.

As treatment of the whole group at risk in Home A did not have a noticeable effect on the spread of the infection, mass treatment cannot be recommended. Treatment of all carriers would seem to be sufficient for maximum effect.

It was realized from the beginning, that certain risks would have to be taken into account. Side effects are by no means unknown when some of the newer antibiotics are administered. For this reason short courses only were given and the clinical condition of the children was watched closely during and after the administration of antibiotics. None of the known dangerous side effects of chloramphenicol or aureomycin were observed, and none of the children developed chronic diarrhoea after this treatment. It was found that administration of sulphonamides after completion of the course of antibiotic treatment stopped the excessive multiplication of antibiotic-resistant bacteria, such as *Proteus* and *Pseudomonas pyocyanea*, and thus removed at least one cause of this well-known after-effect of interference with the normal intestinal flora.

The other possibility would have been the production of drug-resistant strains of pathogenic enteric organisms. In extensive examinations of pre-treatment and post-treatment strains, no indication of an increase of resistance in *Salmonella*, *Shigella* and pathogenic strains of *E. coli* could be discovered.

Infection of adults with *E. coli* O 111 seems to be very common. In the epidemic in Home C, which has been described in the appendix, there were five carriers of a *coli* against only two infected with *Sh. sonnei*. In Home A a wardmaid became infected as soon as *E. coli* was introduced, whereas no adult could be discovered during the long drawn out endemic of *Sh. sonnei* infections. In fact, infected adults have been found in most outbreaks of a *coli* infections which we have studied. Often the infection in adults causes only minor discomfort, but in our experience dysenteric symptoms are by no means rare.

As has already been noted in the previous paper, careful questioning is necessary to obtain the admission of loose stools, nausea and vomiting from the staffs of institutions which care for children. Regulations in these homes are such that employees are penalized when they report sick, and therefore indispositions, even of serious nature, are often ignored. It is highly questionable whether this policy results in a saving for the authorities, as infected employees are likely to cause major outbreaks by staying on duty.

Summary and Conclusion.

Epidemiological studies in institutions which care for young children confirmed the beneficial effect of early treatment with antibiotics on enteric infections in individual cases. It reduced the severity of the disease and the rate of hospitalization. No untoward side-effects were observed.

This treatment had no marked effect on the spread of infection to other children in the same home, which was not unexpected, as, in most instances, the sources of infection were adults or older children.

Early treatment also failed in one home to prevent endemic spread caused by insanitary practices.

Infections of adults with pathogenic strains of *E. coli* seem to be common.

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Appendix: Two Outbreaks of Enteric Infections in Children's Homes.

Home A.

The children at risk numbered 38, and 12 (31.4%) became infected. The staff numbered six. The ages of the infected children were as follows: twelve months (2), seventeen months (2), eighteen months (3), twenty months (2), twenty-two months (1), twenty-three months (1), twenty-four months (1); the average age was 18.3 months. There were no hospital admissions. On July 25, 1952, the child N was admitted to the home; on July 28 examination revealed the presence of *E. coli* O 111. On July 30 examination of nine children with loose motions gave negative results; examination of three members of the staff gave negative results. On August 4 examination of six children with loose motions gave negative results; examination of two members of the staff gave negative results. On August 11, five children with loose motions were examined, with negative results. On August 18, four children with loose motions were examined, and two were found to be harbouring *E. coli* O 111. On August 20, nine children with loose motions were examined, and eight were found to be harbouring *E. coli* O 111; on the same day one member of the staff was found to be harbouring that organism. Prophylactic measures were then taken. On August 25, all the 38 children were examined, and one was found to be harbouring *E. coli* O 111. On September 1 a child who returned to the home after an absence of eleven days was found to be harbouring *E. coli* O 111. No further pathogenic organisms were isolated.

Home B.

The children at risk numbered 32, and 28 (81.2%) became infected. The staff was changed according to need. The ages of the infected children were as follows: two months (1), four months (3), five months (1), six months (1), seven months (2), nine months (1), ten months (1), eleven months (2), twelve months (2), thirteen months (1), fourteen months (2), sixteen months (1), eighteen months (1), nineteen months (2), twenty months (4), twenty-two months (1), twenty-three months (1), twenty-four months (1). There were 14 hospital admissions, and a total of 164 days were spent in hospital. On August 20, 1952, four children were ill, with vomiting and diarrhoea. On August 21 the four children were examined; two were found to be harbouring *E. coli* O 111, and two *E. coli* O 111 together with *Sh. sonnei*. On August 25, of 17 children examined, 12 were found to be harbouring *E. coli* O 111 and two *Sh. sonnei*. On August 27, of 15 nurses examined, one was found to be harbouring *E. coli* O 111, and of three domestics examined one was found to be harbouring that organism. On August 28, 15 nurses and three domestics were examined, with negative results. On August 29, of 10 nurses examined, two were found to be harbouring *E. coli* O 111, and of five domestics two were found to be harbouring the same organism. The epidemic continued until October 14, 1952.

NASAL SEPTOPLASTY.¹

By T. G. MILLAR,
Melbourne.

CONSERVATION of normal tissues is an accepted principle in any surgical procedure.

Many yards of normal septal cartilage have been removed since the operation of submucous resection began. Most of this could have been saved with advantage to the patients. That deformity of the nasal bridge can occur after orthodox submucous resection is shown by the fact that leading text-books advise against the operation in patients aged under eighteen years. In my experience changes in the bridge can occur at any age in a percentage

¹Read at the annual meeting of the Otolaryngological Society of Australia (British Medical Association), Sydney, August, 1953.

of patients on whom the orthodox operation has been carefully performed (Figure I).

Many children have septal deformities causing nasal obstruction, one very common variety being a prolapse

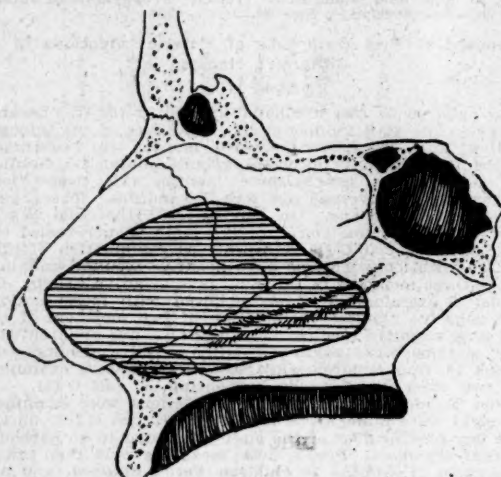


FIGURE I.

Orthodox submucous resection of septum. The shaded area indicates the extent of bony and cartilaginous septum usually requiring removal. (From Thomson and Negus, 1948.)

of the anterior margin of the septum into one naris. If these deformities are not corrected it is likely that secondary effects will occur, such as (i) development of a crooked tip of the nose, (ii) chronic mouth breathing and all its sequelae, such as malocclusion and chest troubles.

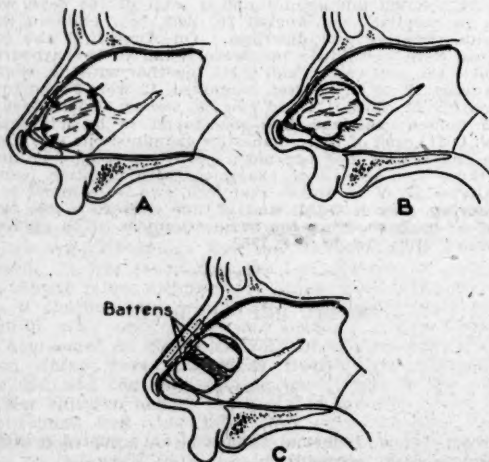


FIGURE II.

A, traction forces following submucous resection; B, sequelae of such forces; C, batten's in situ counteracting traction forces. (From Fomon *et alii*, 1948; reproduced by permission of the editor of *A.M.A. Archives of Otolaryngology*.)

Septoplasty can be applied to all types of septal deformity at any age with excellent results and no fear of deformity of the nasal bridge. In 1946 Fomon *et alii* (1946, 1948) claimed to prove that "saddling" of the nose after sub-

mucous resection was due not to removal of septal support, but to the development of internal stresses arising from cicatrization of the deskeletonized connective tissue for the same reason that the pull of scar tissue in the region of the eyelid may cause ectropion (Figure II). This concept of the cause of post-operative depression of the nasal bridge is further developed by defining its "weak point". This is the point at which the lower portions of the upper lateral cartilages are attached to the septum (Figure III). Fomon *et alii* advocate removal of displaced cartilage with replacements by grafts of the same cartilage in the "weak area". Septoplasty is a much simpler procedure and avoids the hazards of grafting. It depends on the fact that once the septal cartilage is severed from its attachment to the vomer inferiorly and from the perpendicular plate of the ethmoid posteriorly, it becomes very mobile and can be swung into the midline and tends to remain there. In some quarters this is termed the "swinging door" operation.

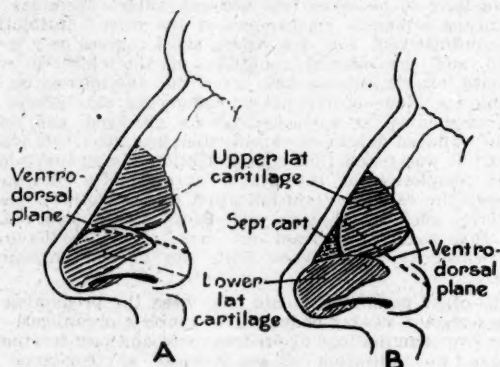


FIGURE III.

Division of the septum by a ventro-dorsal plane passing through the point at which the upper lateral cartilages are attached caudally to the septum, indicated by the interrupted line. A, upper lateral cartilages extending to the caudal end of the septum; complete removal of the septum will not cause saddling. B, upper lateral cartilages swinging away from the septum above its caudal margin; submucous resection likely to result in saddling. (From Fomon *et alii*, 1948; reproduced by permission of the editor of *A.M.A. Archives of Otolaryngology*.)

Etiology and Mechanism of Septal Deformities.

Consideration of the mechanism of septal deformities provides a standard plan for their correction by septoplasty.

Traumatic deformities are usually confined to the septal cartilage and are due to force applied at the "weak area" of the nasal bridge referred to above. There is no typical form, but luxation of the cartilage is most likely to occur along the lines of junction with the vomer and the septal process of the palate.

Developmental deformities are due to disproportion between the various parts. The nasal septum occupies and is confined by the space limited above by the bridge of the nose, the cribriform plate and the body of the sphenoid, and below by the palatal processes of the maxillae and the horizontal part of the palate bone. Shortening of this diameter, unless the septum is correspondingly diminished, must result in bending or overlapping of the component parts of the septum. The vomer ossifies in two bony laminae from behind forwards. Over-nourishment of one of these laminae or the meeting of more resistance by one than the other at the suture lines may be the cause of septal deformities.

Thus the majority of septal deformities are in the region of the suture lines, the commonest developmental one being the horizontal spur due to overlapping of the cartilage at the suture between the cartilage and the vomer.

Operative Steps.

Most deformities can be corrected by disengaging the septal cartilage from the vomer below and the perpendicular plate of the ethmoid behind in the vicinity of the suture lines. The disengaged cartilage is surprisingly mobile and forms a "swinging door", which has a natural tendency to take the mid-line position.

The incision may be (a) orthodox, if the anterior margin of the cartilage is correctly in the mid-line, or (b) along the anterior margin if this is prolapsed into one naris.

Elevation of the perichondrium is carried out on both sides of the cartilage, perpendicular plate and vomer, and

cartilage is removed, the space should be filled by a graft, part of the cartilage or of the perpendicular plate being used.

In some cases, in which the anterior margin is prolapsed to one side and the vomer projects to the other, two incisions may be necessary, one along the anterior margin of the septum and another on the other side of the septum further back.

The operation is concluded by inserting the usual rubber pack, which is removed on the morning after operation.

I have deliberately refrained from mentioning routine details which are familiar to all rhinologists.

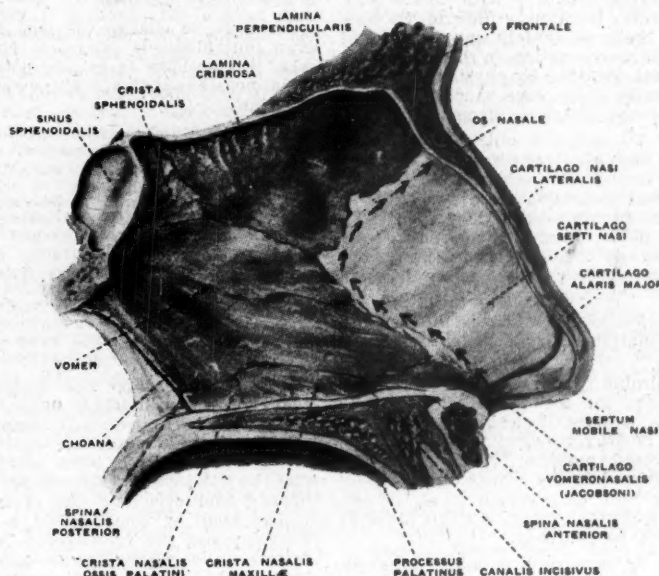


FIGURE IV

The septum nasi. Incision of septal cartilage is indicated by line of arrows. (From Loeb, 1917.)

carried well down over the latter if possible. Sometimes the vomerine section of this step has to be completed after the cartilage has been swung away by the next step.

In the mobilization of the septal cartilage the long nasal speculum is inserted in the space between the cartilage and the flap on the side of the first incision, and a horizontal incision is made through the cartilage from before backwards close to the suture line with the vomer. As the incision is carried backwards resistance will occur when the perpendicular plate is reached, and then the incision is continued upwards close to the suture line with the perpendicular plate (Figure IV). It will now be found that pressure by the blade of the long nasal speculum has moved the mobilized septal cartilage medially, and deformities of the vomer and perpendicular plate can be inspected and an assessment made of what requires removal. Spurs on these two bones can be removed without fear of affecting the nasal bridge.

In cases of prolapse of the anterior margin of the septum a bed should be dissected in the columella and the anterior margin fixed in this by a suture of the flaps. A redundant section of the flap may require foreshortening to give the necessary precision of this suture.

Every septal deformity can be approached by these steps, which provide a standard procedure for preserving the septal cartilage. In very gross deformities of the cartilage small portions may have to be removed, but it is surprising how much can be conserved. In the worst cases, if much

Advantages of Septoplasty on the "Swinging Door" Principle.

The advantages of the "swinging door" type of septoplasty are as follows: (i) it can be applied to every type of septal deformity, including prolapse of the anterior margin. (ii) It can be used in the treatment of children without fear of a depressed bridge. (iii) Operative perforations should be unknown. (iv) There will be no post-operative boggy and flapping septa. (v) Convalescence is easier and hematoma are less frequent than with other types of operation.

Conclusion.

In conclusion, I hope that the time has come when young people will no longer be advised to wait until the age of eighteen years for relief, and that this teaching will be deleted from new editions of leading text-books.

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A DISCUSSION OF DIETETIC AND NUTRITIONAL FACTORS IN RELATION TO DENTAL CARIES AND OF DIFFICULTIES IN EFFECTING CHANGES IN FOOD HABITS.¹

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In a recent paper the dental condition of a group of children was reported (Lillenthal, Goldsworthy, Sullivan and Cameron, 1953). These children live as a community in a large home ("Hopewood House") with comfortable annexes in a fertile country area near Bowral in New South Wales. They are quite adequately supervised, but lead an outdoor life with little restriction on their activities in their leisure times. Data obtained by physical examination showed that physically they were much the same as children of the same age living as members of the general population.

Dental examinations of these children disclosed that their teeth were remarkably free from carious lesions. The average number of decayed and filled teeth per child at the end of February, 1952, was only 0.58, whereas children in the same age groups in the general population rarely pass their eighth birthday without suffering from caries, and have on an average 10 to 20 times as many decayed, missing or filled teeth.

The outstanding difference between these children and groups living in the population at large is in the nature of the diet.

At this point it is desirable to define two of our terms of expression. Diet means the food as taken regularly by an individual, and it is most desirable to place the emphasis on the diet of healthy persons, as distinct from that prescribed for diseased persons. Nutrition is the sum of the processes concerned in the growth, maintenance and repair of the living body as a whole or of its constituent parts. Thus diet and nutrition are entirely different and the terms should not be confused.

The types of food eaten by these children are: vegetables, raw and cooked; salads; fruits, fresh and dried; wholemeal cereals and wholemeal bread; milk, butter and concentrates of vitamins; the intake of sufficient protein is assured by the free use of milk, cheese, soya bean and egg. In contrast, the types of food eaten by children in the general population include white bread and jam, cakes, pastries, sweets and ice cream, sometimes at the expense of the "protective" foods, but more often in addition to them (Clements, 1954).

There is ample evidence to justify the claim that there is a close relationship between the ingestion of large quantities of refined carbohydrates and the prevalence of dental caries: evidence gleaned from studies of native peoples (Campbell, 1939; Restarki, 1943; Price, 1945) and of populations subjected to wartime rationing (Schulerud, 1950; Grandison, 1932, 1953), and from animal experimentation (McClure, 1952). The general assumption based on such observations is that, although a diet may be nutritionally adequate, its carbohydrate component (in particular) has been factory processed, concentrated, deprived of all or most of its fibrous structure and often left devoid of its original content of inorganic salts and vitamins. Such products are commonly called "refined carbohydrate". It thus provides in a form which will readily cling to and around the teeth ample substrate from which acidogenic bacteria may form acid, resulting in a dissolution of the teeth.

In the absence of such refined carbohydrate products as white bread, prepared breakfast cereals, biscuits, cakes, sweets and sugar from the diets of the Hopewood group, and in the absence of any other likely factor such as fluoridated water, it seems reasonable to assume that their

freedom from caries is due to this absence of refined carbohydrate from their diet.

This desirable state of freedom from caries presumably can be attained by any person who is prepared to adjust his dietetic habits or those of persons in his charge so that the carbohydrate intake satisfies nutritional requirements but does not greatly exceed them, and is obtained from the products of wholemeal flour and other cereals and carbohydrates in their natural state. Under the conditions of western civilization the use of refined carbohydrates including white flour products has become an accepted, almost basic, part of the dietary pattern. Therefore in order to satisfy nutritional requirements and to prevent caries, a sustained effort is needed if we are to establish a new dietary pattern.

However, to change the food habits of communities or even individuals is extremely difficult, and we shall deal with this problem in greater detail. Mead (1943) realized the dimensions of this problem when she posed the following question:

Upon what ages of children, through what agencies, through what media should nutritionally valuable habits be urged? What sanctions should be used? How should new foods be presented or old, nutritionally undesirable foods be disparaged? Who should become the surrogate of the new nutrition knowledge, the mother, the teacher, the physician, the baseball hero, or moving picture actress, a puppet character like "Little Jackie" of the Dental Hygiene Division, South Carolina Public Health Service, the "government"? Should the emphasis be upon converting each individual to purposeful, careful eating or upon altering the style of American meals so that individuals will be well fed without having to exercise conscious and unremitting nutritional vigilance?

When we consider the problems associated with the changing of food habits in order to bring about a reduction in dental caries, it quickly becomes evident that the very nature of the disease makes the acceptance of dietary changes more difficult. The aches and pains of this disease may be temporarily distressing, but eventually they disappear, and even the loss of all the teeth seems to be looked upon by some as but a slight physical handicap. Furthermore, the relationship between the diet and the disease is not so obvious as in such conditions as diabetes and allergy. Bruch and Jarris (1943) found a similar problem in the treatment of obese children. They reported that "the obese children, and even more their mothers, raise objections against dietary restriction with such vehemence and regularity that one might be led to believe that eating habits during childhood are such an intimate aspect of the family life that any interference and necessary changes would prove impossible or extremely difficult". On the other hand, with reference to children suffering from diseases such as diabetes they state: "Many showed themselves quite capable of integrating the new eating habits without upsetting their previous pattern of living."

If we leave aside the broader question of the relationship between diet and disease, it must be realized that there are numerous prejudices which make almost any dietary changes extremely difficult to effect. Foremost among these are the prejudices arising from ignorance. Many people lacking training in nutrition look upon any suggested changes as being not merely an interference, but even a deprivation; for example, in the practice of preventive dentistry it is one of our greatest difficulties to persuade many members of the general public that a change in the nature of the child's carbohydrate intake does not mean that he is being deprived of some desirable (implying both tasty and necessary) commodity.

Other prejudices arise from the existence of different social strata. This factor has been operative throughout the ages. Thus it was that the upper classes of the Egyptians, who because of their position ate a diet rich in carbohydrate, developed dental caries, whereas the slave population remained practically free (MacPhee, 1935). In the present-day civilization of, say, the British Commonwealth, it would be extremely difficult to persuade certain groups to serve such foodstuffs as whole wheat cereals or certain vegetables like onions or soya beans, because they

¹Read at the thirtieth meeting of the Australian and New Zealand Association for the Advancement of Science, Canberra, January, 1954.

would be socially unacceptable. It would be just as difficult to persuade such a group to abstain from prepared sweet dishes, elaborate pastries and cakes, because such items are associated with the more affluent groups of society.

A related prejudice springs from the existence of colonies of people living within a large community yet influenced preponderantly by a cultural background which has imposed a rigid dietary pattern upon them. This is not seen so much in Australia as in the United States of America; but with the continual inflow of New Australians it could easily become important. Koos (1943) states that in the United States of America "several Irish families which are two generations removed from foreign born stock continue in this pattern (pork, potato, cabbage, tea) and it is a matter of pride in the family". Whilst this trait is apparently strongest in the Irish, it is found also in most other groups, such as the Hungarians, Germans, Italians and Jews. However, he points out that school lunches and factory cafeteria meals are influencing the diets of these people, as also is the fact that certain foods have a "high value for their status-giving qualities". Here we see the combination and interaction of two sets of factors—the patterns inherited from the past and those operative in the present environment. Koos states:

The relative weights of the two [sets of factors] vary from family to family and from nationality to nationality but a few are found consistently.

The first of these is the status-giving quality of certain foods. A major portion of the low income families we have studied came from European peasant stock, and therefore had been confined to less varied and more simple foods than are available here. Foods which in our culture have only utility value carry in European cultures a connotation of wealth and position. The ability to buy meat at all times, and even on limited budgets, is status-giving and is not likely to be relinquished without adverse effects. The same attitude seems to hold for white bread. Only a few families admitted the use of whole meal breads, and less than 10% used enriched white bread. The identification of whole wheat bread with the dark breads of low income European diets militates against its acceptance. This attitude was so usual about meat (especially beef) and bread, that it offers a clue as to reasons for rejecting contemporary nutritional teachings. A summation of this idea is represented in the statement of a Polish woman (not in the present group) who was asked her reasons for not enrolling in a nutrition course: "Why should I take a course—those teachers just want you to do things a certain way. In Poland we had to eat a certain way—it was all we had to eat. Here we can have what we want to eat—why should I let her [the nutritionist] tell me what to eat and how to eat it?"

This desire for freedom of choice, and especially to choose those foods which are symbols of status, appears to be so universal among the low income groups as to warrant consideration by nutritionists when planning low income courses.

Linked with the prejudices that we have mentioned are certain difficulties to which, at the moment, there appears to be no solution. As the living standards of the world change and the population increases, so there is developing a demand for greater and greater supplies of foodstuffs to ward off famines and to establish a satisfactory intake of nutrients. In order to try to meet such demands, particularly on a world-wide level, it becomes necessary for economic reasons (with our present limited knowledge) to prepare foodstuffs in refined, concentrated forms—such as white flour and sugar—in order that they may be transported over long distances and stored for considerable periods of time. In the world economy and in the world nutritional status of today there seems to be little place for the raw, unprocessed foodstuff. Even in a limited community the cost of maintaining a diet made up of a great proportion of vegetables, fruit, eggs and the more expensive types of cereal products may prove to be beyond the reach of many.

The last difficulty which we wish to mention is one that is closely linked with the dietetic problems of preventive dentistry—the innate liking for sweetness which most people seem to possess. Thus Staz (1938) reports that the primitive "Bantu are fond of honey and face all manner of

discomfort and exposure to stings to obtain it". This appears to be no acquired taste. Natives whose diet is apparently free from refined carbohydrates show on experiencing them an immediate liking for them, as do most children reared on a diet free from refined carbohydrates. It is this attribute, linked with the fact that dental caries is not directly a killing disease, which is probably the key to many of the difficulties encountered in preventive dentistry.

Before offering some suggestions as to methods which might be employed to effect changes in food habits, we should first determine what relationship exists between nutrition and caries and then establish to what level it would be desirable to lower the intake of refined carbohydrate in order to prevent extensive caries.

Much has been written about the relationship between nutrition and tooth structure. Mellanby's (1934) experimental evidence clearly indicates that nutritional conditions are possible which will interfere with the formation of normal teeth. However, there is no unanimity about the direct association between imperfect structure and the occurrence of caries. Indeed, there is evidence that imperfectly formed teeth may remain relatively free from caries, just as teeth of apparently good structure may decay rapidly. The answer to this paradox appears to lie in the nature of the oral environment to which the two types of teeth are subjected after eruption. Thus it has been observed that a nutritionally deficient diet is compatible with a high resistance to dental caries. Marshall Day (1944) observed relative freedom from caries in Indians; Bunting (1936) in white children; Staz (1938) in Bantu natives; and Sinclair *et alii* (1950) in New Guinea natives; all were living on what we regard as nutritionally inadequate diets. However, the compatibility of such diets with freedom from caries is almost certainly due to the chemical and physical nature of the diet rather than to its nutritional inadequacy, and to the fact that populations receiving suboptimal diets are probably restricted to two or three meals a day, with no between-meal snacks. In short, whilst nutrition can be related to structure, it is not necessarily related to freedom from or susceptibility to caries. Merely from basic principles we consider that good nutrition is advisable in order to have good tooth structure and good bodily health.

The question may now be asked: to what level is it desirable to lower the intake of refined carbohydrate in order to prevent extensive caries? Wartime rationing of sugar and sweets was sufficient to bring about an appreciable decrease in the amount of caries in Scandinavia (Toverud, 1949). Grandison's (1932, 1953) observations in England would indicate that this rationing not only brought about local environmental variations, but also had a pre-natal influence, in that teeth more resistant to caries were formed in children conceived during this time. Although the matter is still undecided, it is substantiated to some degree by the work of Toverud (1951) and the animal experiments of Sognnaes (1948). Other, possibly local, influences should not be omitted from consideration. Thus Pedersen's (1953) study of conditions in East Greenland indicated that the prevalence of caries remained unchanged irrespective of whether the imported (that is, "civilized") foods amounted to 5% or 20% of the people's diet; but that the increase in caries was considerable when the intake of imported foods reached 80%. Lundquist (1952) and his co-workers observed the prevalence of dental caries in the mouths of some hundreds of mental patients who were fed on a variety of diets in a variety of ways. It was shown that a moderate intake of refined carbohydrate was compatible with relative freedom from active caries, provided that this carbohydrate was consumed as part of one of the main meals; but that ingestion of a similar amount of refined carbohydrate between meals resulted in a significant increase in dental caries. Schulerud (1950), in a study of wartime conditions in Norway, attempted to place the intake of sugar on a proportional basis relative to the total caloric intake, and assessed the permissible limit at 50 to 60 Calories per 1000 Calories.

There is considerable evidence to indicate that each ingestion of carbohydrate brings about an "acid-attack" on the teeth. Therefore it should be emphasized that eating between the three accepted regular meals may be an important factor in caries, especially because so-called "snacks" generally consist of refined carbohydrates.

The problem we have to solve, then, is how, without upsetting their nutritional status, to change the diet (that is, both the food pattern and feeding habits) of the population in order to restrict the intake of refined carbohydrate and to ensure its ingestion only at the three normal meal times. In a country such as Australia or New Zealand, where there is a buoyant economy and a plentiful supply of foodstuffs, the problem will be much more difficult to solve. People in these countries rarely know the meaning of hunger; hence good eating usually becomes a matter rather of seeking some pleasant variation in dishes than of choosing foodstuffs for their nutritional and dietetic value. In addition, it is always easy to have sweetened items such as cakes and pastries between the main meals. Hence the principal tool at our disposal would appear to be what is generally called health education. Galdston (1949) pointed out how we have failed in the past in "getting over" the lessons we wish to teach people about health:

The prevailing belief was that facts starkly presented, must prove to be the most compelling of arguments.

This belief in the persuasiveness of the bare facts has not been discarded, but is, on the contrary, still widely held. The techniques of presenting the facts are more refined these days, but the greatest bulk of our so-called health education which, be it affirmed, is not health education but disease education, still reflects the conviction that, if you but present the facts clearly and correctly, the public must become interested, impressed and persuaded.

He then outlined the more scientific and realistic method of persuading people to change their habits by appealing to their natural desires.

In the light of dynamic psychology, the individual is seen to be subject to complex and continuously varying patterns of motivation. Hence to be fully effective, health education must take its cue and draw its guidance from a clear knowledge and appreciation of the inherent, that is endogenous, motivations of the individual, at the time and in the circumstances in which the individual is to be addressed.

All health education rests upon the assumption that people prize health and that they are eager to be healthy.

The data of dynamic psychology do not, however, validate the assumption that the individual is eager to be healthy. There is no such instinct, drive, or motivation known to dynamic psychology. The individual wants to eat, to move, to rest, to serve his body's needs. . . . Grown older they will want love and sexuality, and marriage, and a home and children. They will want many things—but they will not want health, i.e. health, pure and simple, unless of course they are hypochondriacs or otherwise mentally and emotionally sick.

Here then we come upon the crux of endogenous motivation, and perceive its relation to health education. The impulsion to carry on the business of living derives from the basic drives inherent in man. Among other basic drives there is none that can be described as the drive to be healthy. Yet to achieve fulfilment, to be successful in the business of living—the individual needs to be healthy.

Bear in mind that according to dynamic psychology the goals of the individual differ and change. . . . These differing "goals" constitute the impulsions we have named *endogenous motivations*. They are endogenous for they arise within the individual, and they are motivations because they are in fact powerful interests, and powerful driving forces. Health education, endogenously motivated, is founded on the current interests of the person addressed, and is pointed in the direction of his immediate goals. The health data offered are such as will help to advance the individual toward his objectives.

It is proverbial that the lads who will ordinarily brook no restraint on smoking, eating, etc., will, if and when they are "on the team", endure every deprivation. What for? For health? No! For victory!

Sherman (1948) confirmed this viewpoint and offered evidence that food habits not only can be changed, but have been changed. He quoted figures indicating increased per capita consumption of milk, vegetables and citrus fruits and tomatoes in the United States of America (1945 as compared with 1915). Similar claims have been made for Great Britain (Drummond and Wilbraham, 1939). Admittedly it may be argued that this increased consumption of certain foods is due much less to realization of their nutritional and dietetic value than to the increased ability of families to buy what are, after all, things they like to eat.

Rowntree (1949) expressed similar opinions and made suggestions for teaching even young infants to accept the right foods in the right way at the right time.

It therefore seems that in communities such as ours changes in dietary habits can best (perhaps only) be effected by a combination of discipline and persuasion in different proportions according to the mental and intellectual status of those towards whom our efforts are directed.

Education in ways of preventing caries, if these involve, as we believe, the observance of certain dietary habits, is obviously not the responsibility of the dentist alone. Such education must begin with the medical practitioner in the pre-natal clinics. It must be carried on in baby health centres and in kindergartens and schools, and should be continued during the adolescent period.

During the pre-school period an approach via endogenous motivation may be made, or, when the child is not mature enough for this, intelligent and patient training by disciplinary methods such as are used to teach the hygiene of excretion may be used.

During the school years and adolescence the method of choice is clearly that of appealing to endogenous motivations, and this can be applied also in the adult period.

Perhaps the most successful approach can be made during pregnancy and the nursing period, when the mother will readily accept variations in her usual dietary pattern if they are likely to benefit her child. If similar advice along these lines could be given to mothers at child health centres, the lessons begun earlier could be reinforced to a point where the motivation pattern became firmly established. Toverud (1951) has described the success of "health stations" established in Oslo for the care and education of expectant mothers. Here regularly throughout their pregnancy they are medically examined and instructed concerning their diet. They are invited to bring their children to the clinics at regular intervals. A dental examination (by a qualified person) is carried out as part of the inspection of the children. Toverud claims that such clinics have led to a decrease in the prevalence of caries.

To sum up, we wish to point out that we are in effect faced with a new problem when considering the dietetic control of dental caries. The problem is one not only of diet, about which we already have some knowledge, but also of education in dietetics and nutrition. The problem of education is novel in so far as it has to be negative in nature. Thus in malnutrition it is simple and understandable to say: "Eat this or eat that and within a relatively short time an observable improvement will take place." In dental caries, on the other hand, we have to say: "Do not eat this or do not eat that and eventually, perhaps after ten years, you will discover that you have avoided dental decay." The approach to problems of malnutrition is therefore positive, while that to the problem of dental caries is negative, because malnutrition is the result of errors of omission, whilst dental caries is the result of errors of commission. To this extent, then, the dietetic control of dental caries is undoubtedly a challenge to those engaged in health education, and it will certainly demand the use of new techniques (Clements, 1954).

Summary.

1. Reference is made to a group of children living on a diet of "natural" foods and remaining free from caries.

2. Evidence is adduced which shows that dental caries can be prevented by means of controlled diet, such that there is rigid restriction of the amount of refined carbohydrate ingested.

3. Because the diet of modern civilized peoples includes an excessive amount of refined carbohydrate, the control of caries through diet involves the changing of food habits without prejudice to the nutritional status.

4. Effecting these changes is not easy because of: (a) the fact that the disease is neither fatal nor in the generally accepted sense crippling; (b) prejudices arising from the existence of (i) ignorance (which causes people to think that such changes constitute deprivation), (ii) different social strata (whereby certain foods are unacceptable to certain groups of people), (iii) different cultural patterns (which characterize national groups whose food habits have been fixed for generations); (c) difficulties related to (i) supply at local and world levels, (ii) cost, (iii) the innate liking for sweet foods.

5. An attempt is made to relate dietetic and nutritional patterns to tooth structure and all three to freedom from caries.

6. Methods for changing the dietetic pattern and eating habits of a nation are discussed in the light of (a) failure of past efforts through the assumption that direct indoctrination will be effective, (b) the teaching of "dynamic psychology", where emphasis is placed on "endogenous motivation".

7. Means and times of applying these modern methods in health education are briefly mentioned.

8. The existence of a new problem in health education is mentioned: the problem of inducing populations to abstain from certain types of foods in the interests of dental health.

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TIGER-SNAKE VENOM: ATTEMPTED RESUSCITATION IN RABBITS.

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THIS study was prompted by a report (Benn, 1951) of death following the bite of the taipan, *Oxyuranus scutellatus*, in which the signs were those of curarization, followed by respiratory and circulatory failure. It seemed reasonable to suppose that the curariform effect might be combated by the measures applied to curarized patients in the operating theatre. To test the validity of this supposition, the animal experiments described in this paper were carried out. Taipan venom is not readily available, but the venom of the tiger-snake, *Notechis scutatus*, which is also a colubride, was taken as an acceptable substitute. Notechis is common in the vicinity of Melbourne, and reports of fatalities, especially in children, indicate that the problem of resuscitation from its bite is by no means an academic one.

Properties of Colubride Venom.

Colubride venoms are of great complexity and have been extensively studied (Essex, 1945; Porges, 1953; Braganca and Quastel, 1953; Johnson *et alii*, 1953). The most obvious component is a neurotoxin, which acts in a curariform manner upon the neuromuscular end-plates and bulbar centres, but not upon the ganglia (Cushny, 1916). In addition to this neurotoxin, colubride venoms contain proteolytic enzymes and phosphatidases. The former are coagulant and locally necrotic, but are poorly represented in the venom of Notechis. The latter appear to be releasers of histamine, and there is evidence that the venoms of at least two colubrides (the Australian copperhead, *Denisonia superba*, and the Indian cobra, *Naja naja*) produce cellular damage and considerable release of histamine (Feldberg and Kellaway, 1937a and 1938). Colubride venoms contain many other enzymes, such as hyaluronidase, nucleotidase, and cholinesterase, of which the functions are often uncertain.

The Experimental Approach.

It was imagined that, if an animal was "curarized" with the venom of Notechis and was given artificial respiration until the curariform effect had abated, it might finally recover. This entailed manual ventilation of the lungs over many hours. Many anaesthetists hold that such long-continued ventilation prevents the development of any phase of negative pressure in the thorax, thus leading to poor diastolic filling and diminished cardiac output. To determine this point, a rabbit was kept apnoeic for nearly five hours by repeated doses of gallamine triethiodide, its lungs being inflated with oxygen to which was added enough nitrous oxide to maintain light anaesthesia. Tracheotomy was done, in order to maintain a clear airway. The animal made a satisfactory recovery, showing

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that prolonged ventilation of the lungs of a rabbit is not incompatible with an effective circulation. The pH of the blood was not determined, but, if alkalosis existed, its degree was not harmful.

Twelve rabbits were each given subcutaneously three minimum lethal doses (M.L.D.) of venom.¹

Two of these animals, used as "controls", were not given artificial respiration. Signs of neurotoxicosis appeared some seven hours after injection, and were as described by Kellaway (1929)—namely, neck-drop, intercostal paresis, diaphragmatic failure, and asphyxial death with terminal convulsions.

Attempted Resuscitation by Artificial Respiration Alone.

In seven animals, an attempt was made to prolong life by artificial respiration until the curariform effect abated. Neck-drop and intercostal paresis developed, as usual, within four to seven hours. In the first experiment, ventilation was performed with nitrous oxide and oxygen, given by mask. After three and a half hours the stomach

was studied by means of a direct-writing electrocardiograph, and the systolic blood pressure was measured by means of a Grant's capsule. This last, which measures the pressure in the auricular artery, gives readings which are lower by 10 to 15 millimetres of mercury than those obtained by cannulization of the carotid artery.

The first circulatory abnormality to be observed was progressive bradycardia. Within thirty to sixty minutes of tracheotomy, the heart-rate had fallen below 300 beats per minute, the normal for a rabbit being 300 to 400 beats. The rate then declined until death ensued. With the bradycardia went a decline in blood pressure: one could predict that, when the rate fell to about 150 beats per minute, the blood pressure would soon become unregistrable, despite transient periods of recovery. Sometimes the circulatory failure came on rapidly, within a period of perhaps two hours, and was soon fatal; at other times equilibrium was reached with a pulse rate of 150 to 200 beats per minute and a systolic blood pressure below 40 millimetres of mercury. In this condition, which is comparable with a heart-lung preparation, the animal might

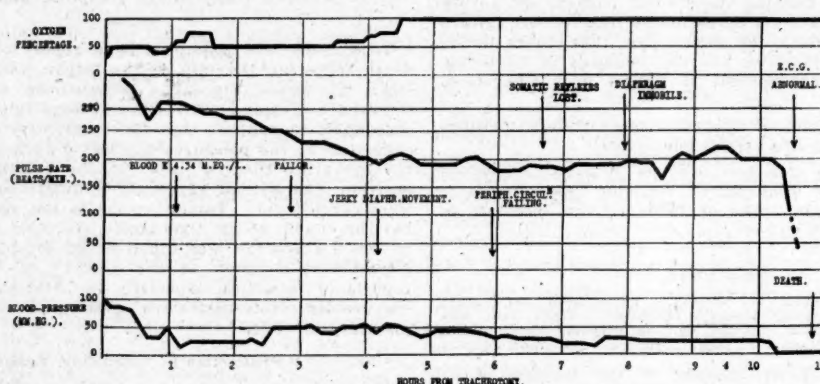


FIGURE 1.

Chart of a representative experiment. The chart begins at the time of tracheotomy, coinciding with the onset of neck-drop and intercostal muscular paresis. Life was maintained subsequently for nearly eleven hours. The progressive march of diaphragmatic immobility and circulatory failure are characteristic of all experiments in the series.

became inflated, reversed peristalsis ensued, gastric contents were regurgitated, and asphyxiation occurred. Subsequently, all animals were anesthetized with ethyl chloride and ether as soon as neck-drop was established; tracheotomy was performed, and the lungs were inflated with nitrous oxide and oxygen (70:30). As the animals became "curarized", the nitrous oxide was gradually withdrawn.

Curarization was much less complete than with gallamine. The diaphragm did not entirely lose mobility for several hours (Figure 1), although the amount of movement retained would not have sustained life in the absence of artificial respiration. The curariform effect showed no sign of abating during the tenure of the experiments. However, jerky movements of the limbs were seen at intervals, sometimes if respiratory "aid" was suspended, at other times for no obvious reason. Some reflex activity—for example, in the cornea—persisted until the terminal stages. In the two "control" animals which were allowed to die of asphyxia, terminal convulsions developed. In one experiment, neostigmine, 0.05 milligramme, was given in the final stage without influencing the degree of curarization, a fact already observed by Cushny (1916).

In all seven rabbits treated by artificial respiration alone, there was a steady decline in circulatory efficiency. This

survive for five hours. The inevitable precursor of death was the appearance of cardiac arrhythmias and changes in the electrocardiogram, such as are often seen in a dying heart. They consisted of dropped beats, spreading *QRS* complexes suggestive of bundle-branch block, deviation of the *S-T* segment, heart-block, and terminal ventricular fibrillation. Accurate analysis of these abnormalities was not possible with the direct-writing electrocardiograph. Repeated estimations of venous pressure were made in two experiments, but showed no significant alteration. In one instance, the serum potassium level and the pH of the blood were estimated before and during the experiment, but neither showed significant deviation from the normal.

Salivation was at times troublesome, necessitating aspiration of the trachea. If the resulting loss of fluid appeared to be excessive, it was replaced by intravenous administration of 5% glucose solution.

Death occurred in every case. When it was apparent, the thorax was opened to reveal a uniform picture. Cyanosis, venous congestion, or petechial hæmorrhages, suggestive of asphyxial death, were absent. The heart showed enormous dilatation of all chambers, with a variable picture of auricular fibrillation, complete heart-block or ventricular fibrillation. The solid organs and brain were normal on macroscopic examination.

Attempts to Sustain Circulation.

In the experiments described above, death was due not to curarization but to circulatory failure. Attempts were

¹ One M.L.D. equals 0.045 milligramme of dried venom per kilogram of body weight. Intravenous injection of the venom causes rapid death from intravascular clotting, the M.L.D. being 0.002 milligramme per kilogram (Kellaway, 1929).

therefore made to sustain the peripheral circulation. In two rabbits "Dextran" was infused intravenously, in a dose of four to five millilitres, whenever the systolic blood pressure fell below 40 millimetres of mercury. In neither case was the heart rate increased or the blood pressure permanently raised. Mere maintenance of the circulating blood volume is not, therefore, remedial. One of these animals received in addition "Antistine", an anti-histaminic drug, in a dose of 10 milligrammes. This was given intramuscularly half an hour after the injection of the venom, again after tracheotomy, and twice intravenously over the next six hours. It did not counteract the bradycardia, or materially raise the falling blood pressure.

Discussion.

The foregoing experiments confirm the observations of earlier workers that the venom of *Notechis scutatus* kills primarily by a curariform action, leading to respiratory paralysis within four to seven hours of the subcutaneous injection of three M.L.D. The variation in action-time may be due either to the difficulty of measuring accurately the small doses employed, or to individual susceptibility. The curariform effect appears to be less complete than with gallamine, in that jerky limb-movements persist even after the diaphragm is paralysed, but is obviously far more prolonged.

Inflation of the animal's lungs with oxygen undoubtedly prolonged life for several hours. It did not, however, prevent eventual death from circulatory failure. It follows that in man, who may receive up to 50 M.L.D. from the bite of a large tiger-snake, the performance of tracheotomy and artificial respiration can scarcely be expected to save life in the absence of other measures, particularly the administration of antivenene, but may be a valuable aid in treatment.

If early death from curarization is prevented by artificial respiration, time is given for the venom to exert its circulatory-depressant effect. Other workers (Gautrelet and Halpern, 1934; Feldberg and Kellaway, 1937b) have studied colubrid venom in the living animal and in perfusion experiments. They have observed arterial hypotension, reduced cardiac output and arrhythmias of various types. Kellaway and Trethewie (1940) have shown that cobra venom releases adenyly compounds, which have a direct cardio-depressant effect. The venom of *Notechis*, a close ally of the cobra, also contains a potent circulatory toxin, manifesting itself in bradycardia and arrhythmia. These suggest a direct toxic effect upon the myocardium, a view supported by the fact that animals in this series did not derive benefit from the maintenance of blood volume or the giving of an anti-histaminic drug. It is therefore probable that their circulatory failure was myocardial rather than peripheral, although a combined action cannot be wholly excluded.

Summary.

1. The previously described curariform action of the venom of the tiger-snake is confirmed.
2. Experiments are described in which the life of rabbits given injections of venom was prolonged for several hours by tracheotomy and artificial respiration. Death always ensued, however, because of inability to control the associated cardio-toxic effects of the venom.
3. It is suggested that, in human cases of severe tiger-snake bite, tracheotomy and artificial respiration should not be omitted. They alone will probably not avert a fatal issue, but they may well prolong life until effective treatment with antivenene can be initiated.

Acknowledgements.

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University of Melbourne. The anaesthetic work, and the fabrication of apparatus of appropriately small size, were carried out by Dr. Geoffrey Kaye, of the University of Melbourne.

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Reports of Cases.

USE OF "WATVIC" MACHINE IN ENURESIS: REPORT OF CASES.

By JOHN BOSTOCK,

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ATTENTION has been drawn to the interesting research of Crosbie on essential enuresis outlined in THE MEDICAL JOURNAL OF AUSTRALIA. Regarding it primarily as a problem in physiology, he has produced a machine which will so condition the patient to awakening and discomfort that the tendency to bed-wetting disappears. Through the kindness of the Watson Victor Company we have been able to use its "Watvic" machine as advocated by Crosbie in a series of twelve cases.

The standard of enuresis is the involuntary passage of urine into the bed, during sleep, at least three times per week.

The bulk of the cases were encountered in the Child Guidance Clinic of the Brisbane Children's Hospital during the routine work in the Department of Medical Psychology of the University of Queensland. All patients had been previously treated unsuccessfully by other means, so that they themselves served as a control.

Method of Treatment.

All patients had a physical and psychological investigation before the commencement of treatment with the "Watvic" machine.

The machine was used according to the method described by the makers. In each case care was taken to show the mother or guardian the exact details of use. Parents were encouraged to report to us weekly, giving night-by-night accounts of progress. This was found essential, as guidance was required on details such as the child's ability to use the machine itself, failures in contact, fear on the part of the child, or questions as to the mode of application.

The periods of treatment varied between four and thirteen weeks, with the median at eight weeks.

Whilst the patient is anxious to be rid of the machine as soon as possible after "cure", it was left with him for

another fortnight in order to cement the new conditioning by further reassurance.

Clinical Records.

CASE I.—A male patient, aged nine years, was a meticulous and obstinate child. He had been a persistent bed-wetter since birth. Toilet training was rigid and commenced early. He was aggressive towards his mother and jealous of his father. Bed-wetting ceased after four weeks' use of the machine. He was still "dry" after six months.

CASE II.—A female patient, aged twelve years, was a slipshod, facile, but somewhat apathetic child, who had been a bed-wetter from birth. The type of her early toilet training was doubtful. She was resentful and frightened of her father. There was considerable domestic insecurity in her home life. Treatment was interrupted by the child, who regarded herself as cured after having 12 dry nights out of 14. Upon her relapsing into constant wetting, the machine was used for a further 18 nights. In the ensuing three weeks there was not a single wet bed. The machine was returned to us after a total period of eight weeks. It has not been possible to obtain reliable reports as to the subsequent progress.

CASE III.—The patient was a female, aged eight years. She was aggressive towards her parents and had obvious feelings of rejection. She was generally irritable and non-cooperative at home. Bed-wetting ceased after 13 weeks' use of the machine and has not recurred after four months.

CASE IV.—The patient was a male, aged seven years, who was not merely dependent and fearful, but also very backward at school. He possessed an over-protective mother, who had stunted his emotional development. Treatment took place in a children's holiday home, to which he had been sent as a "behaviour problem". Relief by the "Watvic" machine was spasmodic, but not maintained. Unfortunately his room was changed on several occasions, and this may have affected the continuity of treatment.

CASE V.—The patient was a female, aged seven years. This meticulous, aggressive, and doubt-laden girl had been a bed-wetter since birth. She rejected her mother, to whom she showed aggression. The mother was very strict, to a degree which accounted for much inevitable hostility. Relief of enuresis was complete, and beds are still dry after eighteen months.

CASE VI.—A male patient, aged thirteen years, was the brother of the patient in Case V. The boy showed aggressive impulses towards his mother. He had been a bed-wetter since birth, though toilet training had been rigid and early. The parents were very strict and over-emphasized the importance of honesty, truthfulness and cleanliness. Bed-wetting ceased after four weeks of treatment, and he has remained still "dry" after twenty months.

CASE VII.—This male patient, aged fifteen years, a highly intelligent youth of good physique, had been a bed-wetter since birth. Enuresis ceased after he had used the machine for three months. He was still "dry" after eight months.

CASE VIII.—A male patient, aged seven years, was a timid, whining, quarrelsome and jealous boy. He had been a bed-wetter since birth. Sibling rivalry was pronounced. He was jealous of an older brother. The mother was over-protective. Bed-wetting ceased after nine weeks' use of the machine, and he was still "dry" after eight months.

CASE IX.—A female patient, aged eleven years, though a conscientious and diffident girl, was well orientated socially. She had "dry" beds at eighteen months, but relapsed to enuresis at two years six months. An excessively fond mother and a happy domestic circle contributed to her environment. Bed-wetting ceased after three weeks' use of the machine. The child continued to wake of her own accord once each night.

CASE X.—The patient was a male, aged thirteen years. From the commencement this boy had a passive, dependent, defeatist attitude to his frustrating environment of overwork and little play. He had been enuretic since birth.

The "Watvic" machine was used for nine weeks without cure. It is noted that parental supervision and use of the machine were constantly erratic and careless.

CASE XI.—A female patient, aged five years, was a timid, dependent child who had been enuretic since birth. Severe sibling rivalry was repressed beneath a façade of tender care for a baby brother. The child was so frightened of the machine that it was impossible to attach it for more than two nights. She refused to resume its use. Treatment was discontinued.

CASE XII.—A male patient, aged thirteen years, had been a bed-wetter since he was six years old. He was a boy with "a chip on his shoulder", with feelings of guilt and unworthiness. Hostility towards a stern father and a rejecting mother was pronounced. Success was temporary. He continued to relapse when he was left without the machine.

TABLE I.
Summary of Results of Treatment by the "Watvic" Machine.

Serial Number.	Sex.	Age. (Years.)	Period of Treatment.	Result. ¹
1	M.	9	4 weeks.	Relieved.
2	F.	12	8 weeks.	Relieved.
3	F.	8	13 weeks.	Relieved.
4	M.	7	14 weeks.	Unchanged.
5	F.	8	6 weeks.	Relieved.
6	M.	13	4 weeks.	Relieved.
7	M.	15	3 months.	Relieved.
8	M.	7	9 weeks.	Relieved.
9	F.	12	15 days.	Relieved.
10	M.	13	9 weeks.	Unchanged.
11	F.	5	2 days.	Unchanged.
12	M.	13	8 weeks.	Unchanged.

¹ In the above table the word "relieved" implies the entire cessation of enuresis. Insufficient time has elapsed to warrant the use of the word "cure".

The median time of treatment was eight weeks, including two weeks during which the machine was left with the patient for reassurance.

Comments.

In view of the intractability of chronic enuresis to treatment, it is encouraging that of 12 patients treated eight were relieved. Our intention was to treat a larger number, but as only one machine was available this was impossible. Our results, outlined in this preliminary report, warrant a more extended use of this method.

The improvement in the child's psychological condition after "relief" of the enuresis has been a pleasing feature of many cases in this series. It varies from the child's being less troublesome to the statement of one parent who said that after the cure the child had suddenly "grown up" and was no longer whining and petulant.

Enuresis has a devastating effect on the character of the child, on the parental attitudes and on the over-all interpersonal relationships in the household. Were it not for the urge to concealment which impels the average parent to minimize her worries, enuresis would long ago have been seen in better perspective as a major problem. The increased zest for living seen after cure is not entirely due to the enuresis factor *per se*, but to the fact that, *pari passu* with the use of a physiological aid, parents are instructed in the arts of living in a family. They cooperate in providing a pleasant atmosphere in which fear of enuresis is eliminated.

That the improved outlook is not invariable was shown forcibly in Case I. It would seem that the psychological background could not be surmounted. The extremely possessive parents were incapable of altering their attitudes, and we suspect that the patient was deprived, by the cure, of one method of "getting even" with mother. He substituted a new one by becoming truculent, practising passive resistance.

The foregoing results are distinctly promising and suggest that the use of mechanical means—for example, the "Watvic" apparatus—to condition the patient to awaking

before micturition during the sleep period has a distinct therapeutic value, and must be regarded as a useful adjuvant in the alleviation of an extremely distressing disorder.

With regard to the rationale of treatment, one is reminded of the oft-quoted remarks of a learned judge that, whilst a decision on a problem may be correct, the analysis of contributing causes is often misleading. Thus claim to cure may be justified, but the basis may not necessarily be dependent upon a single factor.

Crosbie has rightly stressed the importance of the physiological mechanism and deserves great credit for his practical approach. On the other hand, there are numerous psychological angles to be considered. In the case of more than one failure it is obvious that the psychology of the parents or operators has contributed to the end result.

From our experience the physician who uses the machine must be prepared to pay close attention to all details of its use and maintain a close liaison with the family throughout the whole period of treatment. Our failure occurred when this contact could not be maintained.

Whilst dogmatism is impossible in such a small series, there are indications of two types of cases: in the first the parents cooperate towards altering the adverse psychological conditions, whereas in the second the parents refuse to alter their way of life in the belief that the machine is a cure-all. The results are better in the first group.

It is significant that our patients with one exception had been early conditioned through over-rigid toilet training. The psychological implications of this have been discussed previously (Bostock and Shackleton, 1951, 1952).

More extended use of this method will help to solve the problem of reconditioning.

Summary.

1. Twelve patients with chronic enuresis were treated with the assistance of the "Watvic" apparatus; eight were relieved.

2. Attention is drawn to the need for close supervision of details of treatment.

3. Improved parental psychological attitudes are the important factor in success.

Acknowledgements.

Our thanks are due to Watson Victor, Limited, for placing a "Watvic" machine at our disposal for the purpose of this research. We are grateful to Dr. Aubrey Pye and to Dr. D. C. Fison for permission to use the facilities of the Child Guidance Clinic of the Brisbane Children's Hospital and for permission to publish accounts of cases; also to Dr. Irene Phillips, Dr. Peter Row, Dr. V. Sampson and Dr. J. De Vidas for allowing us access to their patients.

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Reviews.

Kielland's Forceps. By E. Parry Jones, M.B., B.S., M.R.C.O.G.; 1952. London: Butterworth and Company (Publishers), Limited. 9" x 5½", pp. 222, with 115 illustrations. Price: 49s. 6d.

THIS book is based on a considerable personal experience with Kielland's forceps in the Liverpool Maternity Hospital, and includes a discussion of the indications for the use of the instrument, its limitations and associated dangers and the maternal complications which may follow on its use.

It is a book for the specialist and for the practitioner with obstetrical leanings as the technique is not advised for the occasional operator.

Kielland's forceps are little used in this country and their value has not been adequately assessed. This book provides a useful guide to those who in a search for a better way of dealing with occipito-transverse positions of the vertex are prepared to make such a trial. The volume is amply illustrated with simple, clear drawings. An interesting appendix is an English translation of the original description by Christian Kielland in 1916.

In addition the author considers the use of forceps in general in this age of more frequent Caesarean sections. Though conflicting with classical teaching these views are well worthy of consideration.

The Psycho-Analysis of Artistic Vision and Hearing: An Introduction to a Theory of Unconscious Perception. By Anton Ehrenzweig; 1953. London: Routledge and Kegan Paul, Limited. Sydney: Walter Standish and Sons. 8½" x 6", pp. 304, with 10 plates and 25 text figures. Price: 25s.

IN this book Anton Ehrenzweig calls attention to sub-conscious, inarticulate and unformulated mental processes which, he maintains, contribute richly to artistic creation and appreciation. According to the author two processes are involved, one upward concerned with the meaning attached to thing-free form elements and with reification and projection of gestalt or integrated elements into gestalt-free forms, the other downward, a repressive process which pulls perception down to inarticulate levels. An orderly, faithful representation of an object by means of line and colour is not necessarily a work of art. The artist attempts to convey a message or meaning, to evoke an affective as well as an intellectual response, and uses techniques, not always consciously, which may result in a wide departure from reality, for example, abstract art. Cézanne, we are told, used to stare at his model for hours on end before he put brush to canvas. One might well ask whether his distorted perspectives were not due to fatigue rather than to highly sensitive perception. Perspective, Ehrenzweig suggests, is not a rational achievement but prompted by the urge to express an irrational symbolism, which in the case of representations of the body has a sexual basis. Turning now to the unconscious form principle of music, the author discusses the role of overtones which usually are not perceived (he says "inaudible"), but which contribute to tone quality and, following Arnold Schönberg, influence musical form. By its concentration on rational forms Western music has, the author believes, suffered aesthetic loss, and in comparison with Eastern music may well be regarded as aesthetically inferior. But, we may ask, is enjoyment of music purely sensual (narcissistic) without the pleasurable appreciation of nicely balanced composition (jazz versus Mozart)? The control of breath in singing and speech is to be compared with the cultural inhibition of anal expulsion, "in which", says Mr. Ehrenzweig, "I have come to see more and more the starting point of all human civilization". In a postscript the author concludes, in contradiction to Freud's view, that cultural inventions, far from tending to restrict expression of libido, have actually rendered "normal libidinous life" more secure by neutralizing archaic urges. The work teems with interesting speculations along Freudian lines; but while conceding the difficulty of a clear exposition of the inarticulate, we cannot allow that the author has succeeded in avoiding "unnecessary psychological jargon". Non-Freudian readers may conclude that the book is full of nothing else.

Progress in Neurology and Psychiatry: An Annual Review. Edited by E. A. Spiegel, M.D.; 1953. Volume VIII. New York: Grune and Stratton. 9" x 6½", pp. 604. Price: \$10.00.

"PROGRESS IN NEUROLOGY AND PSYCHIATRY" for 1953, edited by E. A. Spiegel, pursues its inexorable annual course with an offering of 591 pages, 36 chapters and reference to over 3200 publications: it devotes 69 pages to the basic sciences, 57 pages to neurosurgery, 180 pages to psychiatry, and 211 pages to neurology. A chapter on the biochemical aspects of neurophysiology appears this year and will alternate annually with the electrophysiological approach. A special chapter on electromyography has been written and ophthalmoneurology appears as a biannual offering. Otherwise, the book is the same as usual. The five chapters on the basic sciences deal with neuroanatomy, neurophysiology, regional physiology of the central nervous system, neuropathology and pharmacology of the nervous system. The neurological section has chapters on clinical neurology, otoneurology, neuroophthalmology, epilepsy, the autonomic nervous system, paediatric neurology, neuroendocrine

relationships, electroencephalography, clinical electromyography, cerebro-spinal fluid, and radiology of the skull and central nervous system. There are six chapters on neurosurgery: peripheral nerve surgery, surgery of the spinal cord and column, cerebral trauma and traumatic infections of the central nervous system, brain tumours, surgical treatment of pain and motor disorders and, lastly, psychosurgery. In the psychiatric section are quoted nearly 1200 papers in chapters on clinical psychiatry, mental hygiene, forensic psychiatry, criminal psychopathology, child psychiatry, the neuroses, alcoholism, psychosomatic medicine, psychoanalysis, projective methods, group psychotherapy, psychodynamic (shock) therapy, psychiatric nursing and occupational therapy, and rehabilitation.

This is essentially a book of reference, of use to research workers and teachers in neurology and psychiatry. The specialist neurologist or psychiatrist may occasionally refer to it as a source book, but will certainly not find a catalogue like this readable. This annual volume appears too often for its reviews to be balanced. Hannay has stated:

"Half of your book is to an index grown.

You give your book 'contents', your readers none."

Not half, but almost the entire volume shows this tendency.

Dukes' Bacteria in Relation to Nursing. Revised by Stanley Marshall, M.D., B.S. (London), M.R.C.S.; Second Edition; 1953. London: H. K. Lewis and Company, Limited. 18½" x 6", pp. 214, with 18 illustrations, 12 in colour. Price: 17s. 6d.

This book is written primarily for trained nurses studying for the British Sister Tutors examination, but the author expresses the hope in the introduction that it also may be of use to nurses sitting for the Diploma of Nursing and other examinations. Certainly as far as the book itself is concerned it is most excellently written and will more than adequately serve its purpose; but from an Australian viewpoint its subject matter goes beyond the scope of nurses sitting for the A.T.N.A. examinations. It would, however, be an admirable aid for any trained nurse intending to work in a bacteriological laboratory.

The work may well be termed a complete introduction to bacteriology and contains chapters ranging from "The Use of the Microscope" to "Penicillin Sensitivity Tests". All the various practical simple procedures associated with the subject are described and the main staining methods are detailed.

From a nurse's angle the section headed "Sterilization, Antiseptics, Disinfection" is of major importance, and as it covers some twenty-seven pages it can be seen that the subject is discussed fully. The classification of the different bacteria is clearly described and all stages of infection resulting from various microorganisms, from pus formation to acute and passive immunity, are other important topics. In revising the book for the present edition Dr. Marshall has added a short chapter on the filterable viruses, and thus with this and other modern developments being included the work is now right up to date.

Manual of Medical Emergencies. By Stuart C. Cullen, M.D., and F. G. Gross, M.D.; Second Edition; 1953. Chicago: The Year Book Publishers, Incorporated. 7" x 5", pp. 278, with 34 illustrations. Price: \$4.50.

This book, as the title implies, is confined to medical and not surgical emergencies. However, a lengthy chapter on head injuries does verge on to the surgical side, as also does the one titled "Technics of Venipuncture". Diagnostic and therapeutic details are clearly enumerated for all types of emergencies, from those of cardiac or cerebral origin to acute poisoning, allergic disturbances and climatic upsets such as sunstroke and exhaustion. Poisoning from various rodenticides is included, and it is of local interest to find no mention made of thallium compounds in this regard. Sensitivity to local anaesthetics and to the antibiotics is discussed, and in regard to penicillin it is stated that "allergic reactions occur in ten per cent. of cases". This figure may seem high, but serves to stress the need for careful use of penicillin, for the urticarial reactions from it can at times be fatal to the severely ill who may be given the drug as a life-saving measure.

The relative efficiency of the various methods of artificial respiration is graphically illustrated, and this shows the recently discarded Schäfer method to be easily the least efficient, while the authors point out the advantages of the Silvester, Nielsen and Eve methods. Coma is discussed, too, and the various types such as diabetic and cerebral coma are differentiated. Venomous bites described are those of

American reptiles and insects such as the rattlesnake and the black widow spider so that only the general principles of their treatment can be used against Australian snake and spider venoms.

The book is illustrated by photographs, by drawings and by a series of cartoons which dramatically point out the right and wrong ways of treating the various emergencies. All these features make the work an extremely practical one and its convenient size enables it to be carried easily in a case or first-aid kit.

Conduction Anesthesia. By George P. Pitkin, M.D., F.A.C.S., F.I.C.A., edited by James L. Southworth, M.D., F.A.C.S., Robert A. Hingson, M.D., F.A.C.A., F.I.C.A., F.I.C.S., F. (Faculty of Anes.) R.C.S. (England), and Winifred M. Pitkin, M.A. (Oxon.), B.M., B.Ch. (Oxon.), M.R.C.S. (England), L.R.C.P. (London), M.D.; Second Edition; 1953. Philadelphia: J. B. Lippincott Company. Sydney: Angus and Robertson, Limited. 10" x 7½", pp. 1026, with 585 illustrations. Price: £10 15s.

The first edition of Pitkin's "Conduction Anesthesia" appeared in 1946. It consisted basically in the work of G. P. Pitkin (*obit*, 1943), edited by J. L. Southworth and R. A. Hingson. There were eight other contributors, mainly originators of special techniques, such as continuous spinal analgesia or refrigeration. In this second edition, the editorial task has been carried out by Southworth, Hingson and W. M. Pitkin alone. They are, respectively, the surgeon, anaesthetist and anatomist-clinician of a surgical team. Their abandonment of the symposial form confers unity of design and style, at some sacrifice of variety of outlook.

As in the previous edition, the opening chapter shows how certain errors and redundancies of the early workers have been carried over into later works upon regional analgesia, and how success with this technique is primarily dependent upon accurate knowledge of anatomy. It is therefore not surprising that the first 276 pages of this edition are devoted to the anatomy of the nervous system.

The major additions to the earlier text are useful chapters on the anatomy of the vertebral canal and its contents; on extradural block analgesia; on topical analgesia, and on the complications of block analgesia in general. The remainder of the earlier text has been revised and brought up to date. This is especially evident in the chapters which deal with the pharmacology of analgesic drugs, with spinal analgesia, and with the therapeutic applications of conduction analgesia.

The editors have retained much of Pitkin's original writing. It is true that they do not hesitate to dissent from his views upon occasion. A good example of this is supplied by Chapter II, which deals with brachial-plexus block. Pitkin was averse to the supraclavicular approach to the plexus, favouring the axillary or the lateral. His editors point out that the supraclavicular approach has in fact proved to be both simple and effective, and they describe the Macintosh-Mushin technique for it. Their loyalty to the memory of Pitkin has in fact hampered them. It has obliged them to give, in many instances, a variety of ways of arriving at a given result, and to state their personal views as an addendum. As acknowledged experts, they might well have stated their personal preference in the first instance, describing alternative methods more briefly and in smaller type. This would have enhanced the value of the book to the average anaesthetist, who is not always in a position to judge between alternatives.

Certain major techniques, which were but newcomers in 1946, are now described at full length, in the light of added experience. The chief of them are continuous caudal and continuous spinal analgesia. Upon the application of these to obstetrics, Dr. Hingson is a world authority. His evaluation of them is candid, and he attempts to render it also statistical.

A certain time-lag is detectable in the text. Thus, whilst the list of analgesics includes such comparative late-comers as lidocaine ("Xylocaine") and "Efocaine", there is no mention of the inflammatory reactions which have been reported in connexion with the latter agent. Again, whilst a very full list of vasopressor drugs is given, nor-epinephrine is not of their number. Such omissions are, however, perhaps inescapable when a very long text has to be prepared at a time of rapid technical development.

The volume is admirably produced. The 585 illustrations are magnificent. The work is encyclopaedic in range. It is not an easy one for the learner to use, but it will certainly take its place in every library as a standard work of reference.

The Medical Journal of Australia

SATURDAY, JULY 24, 1954.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

A YARDSTICK OF SURGERY.

In many large hospitals today the staff holds meetings from time to time at which the case histories of certain patients are reviewed. The clinical notes are discussed, the treatment is reviewed, and if death has occurred, the pathological findings discovered at post-mortem examination are correlated with the clinical history and frank discussion takes place about what has been done or what ought to have been done and was not done. In any surgical case which is the subject of discussion a specimen removed may or may not be investigated and opinions expressed about it. One wonders how often this is done. It is clear that if a specimen removed at operation was examined carefully and no pathological lesion was found in it, the question might be asked whether operation ought to have been undertaken or not. If the specimen comprised malignant tissue, the type of growth would, of course, be described and opinions might or might not be expressed whether removal had been widely enough carried out. If the art of surgery is to be perfected, two aspects require special consideration. One is that no unnecessary operation shall be carried out, for as has so often been stated, it is an accepted fact that unnecessary surgery is bad surgery. The second *desideratum* is that when operation is carried out for malignant disease, removal shall be sufficiently wide to give the patient a reasonable chance of recovery and a subsequent useful life. According to

Robert Elman, who contributes a signed editorial to *Archives of Surgery* for March, 1954, the American College of Surgeons has been much concerned about the performance of unnecessary surgery. One of the methods which it has devised to avoid this calamity (for calamity it is) has been the formation in each hospital of what is known as a tissue committee "whose function it is to scrutinize all surgical specimens in order to estimate the extent, if any, of unnecessary surgery". Elman adds that these tissue committees could also use the same material to study the problem of inadequate surgery. Elman points out that adequate surgery is particularly essential in many kinds of cancer, in order to give patients their best chance for survival. He admits that in certain fields there are honest and justifiable differences of opinion as to what would constitute adequate surgery, particularly in terms of the recent trend toward more radical procedure. He adds that on the other hand, in many cases, there is well-established evidence to support readily stated criteria for the adequate removal of malignant disease. The surgeon who in such a case fails to do the full operation should, he thinks, be required to justify the inadequate procedure and explain the extenuating circumstances, if any, which influenced his decision. Elman illustrates his remarks by reference to two reports. One of these is from C. W. Murrow, published in *Archives of Surgery* in 1948. (Incidentally, this carries a lesson to Australian authors who grumble about having to take care with their references to the literature. Murrow's article is quoted in Elman's editorial as having been published in 1951; it actually appeared in 1948.) Murrow reported on a series of patients who were followed for five years or longer after radical mastectomy by fifteen different surgeons. Reference to the article itself shows that the number of patients was 87. The lymph nodes were carefully counted in each specimen after its arrival at the laboratory. A wide difference was found in the number of nodes removed by different operators. At least two of the surgeons were apparently content with the removal of relatively few nodes, while others consistently removed a much greater number. The five-year follow-up results were startling and significant. Of the patients operated on by two surgeons who removed specimens containing an average of 15.0 and 28.2 lymph nodes respectively, only 50% and 66% of the patients were alive at the end of five years, even though none of the lymph nodes in the specimens showed evidence of carcinoma. By contrast, of the patients operated on by four surgeons whose specimens contained an average of 28.8, 35.8, 38.0 and 46.3 lymph nodes respectively (none containing cancer), all were alive at the end of five years. It is unnecessary to give details of the other cases quoted by Elman. He is justified in the conclusion that the counting of lymph nodes in the removal of cancer of the breast is one available method of measuring the adequacy of operation. It perhaps need scarcely be mentioned that it is important in the removal of the areas containing lymph nodes that removal should be effected in one piece. Elman declares that it is wasteful and myopic to expend so much effort on programmes to detect cancer at an early stage without at the same time taking measures to ensure its adequate removal. He

states that even if time-consuming techniques of examining specimens are required in order to make such studies, the potential rewards to the patient are so great as to make the effort worth while.

It may be concluded that the establishment of such investigatory committees in Australia would be for the ultimate good of Australian surgery. They would need to be brought into being by surgeons as a self-imposed discipline. This does not mean that these committees would be in any sense disciplinary committees. It has already been pointed out that at the present time discussion about the treatment of patients is quite often undertaken, and there seems to be no reason why something of the kind mentioned by Elman for the control of inadequate surgery and devised by the American College of Surgeons for the elimination of unnecessary surgery should not be brought into being. The work would be undertaken for discussion so that surgeons would be able to assess their own work. Action would necessarily follow. It would be safe to conclude that any surgeon who refused to cooperate in such a collective arrangement would necessarily be fearful that his own standard of achievement would not comply with what was requisite.

Current Comment.

BREAST FEEDING AND RESISTANCE TO GASTRO-ENTERITIS.

VARIOUS observers have reported that breast-fed babies are relatively resistant to gastro-enteritis. David Levi¹ drew attention to the fact as a vital aspect in results of surgical treatment of congenital pyloric stenosis. He described gastro-enteritis as the one danger to be feared in a child with pyloric stenosis, whether medically or surgically treated, the risk being proportional to the duration of hospital treatment. In his series, 100 breast-fed infants underwent operation for pyloric stenosis without a death. A similar series of 46 operations on bottle-fed infants resulted in five deaths—all from gastro-enteritis. M. B. Alexander,² in a review of 456 infants treated in a hospital unit for enteritis, noted that in this comparatively large series few breast-fed infants were admitted to the unit with enteritis, and that maintenance or reestablishment of breast feeding was usually all that was required for their recovery. The majority of infants with enteritis and almost all those with a severe infection had been artificially fed before admission to hospital. In a discussion on the nature of this resistance to gastro-enteritis on the part of the breast-fed infant, Constance A. C. Ross and E. A. Dawes³ state that the predominance of *Lactobacillus bifidus* in the faeces of the breast-fed infant suggested to them that the intestinal environment of the breast-fed infant was unfavourable to the establishment of *Escherichia coli*, particularly of the types associated with infantile gastro-enteritis. With that in view, they carried out certain experiments in an attempt to study features of the intestinal environment of the infant in relation to the growth of *E. coli*. Previous studies had shown that there was a qualitative difference in the faecal excretion of amino acids by the breast-fed infant and by the artificially fed infant. This suggested that certain amino acids might either stimulate or inhibit the growth of *E. coli*. An

investigation, previously reported by Dawes, of the growth of a particular laboratory strain of *E. coli* on single amino acids as the sole source of nitrogen in a glucose-salt medium, was extended to certain types of *E. coli* associated with infantile gastro-enteritis.

It is known that a single amino acid added to a medium otherwise capable of supporting growth may inhibit growth, but that this effect can be prevented by the simultaneous presence of certain other amino acids. A study of the growth of different types of *E. coli* on single amino acids would, therefore, be of limited value in the assessment of their ability to grow in the complex mixture of amino acids present in the intestines of infants. To overcome this difficulty, the growth of these organisms was studied in sterile faecal extracts from artificially fed babies, from breast-fed babies and from babies suffering from gastro-enteritis associated with a specific type of *E. coli*. This experiment made it possible to assess the growth-promoting effect not only of the amino acids but also of all the metabolic products in the faeces. The organisms used in the investigations were three type strains of *E. coli* (0-111, 0-55 and 0-26) obtained from the State Serum Institute, Copenhagen, and an untypable strain obtained from a healthy artificially fed infant. It was found that with single amino acids as the sole source of nitrogen in a glucose saline medium there was no significant difference in total growth between the specific types of *E. coli* and the untypable *E. coli*. *E. coli* 0-111 grew equally well at a pH of 7.1 in the sterile faecal extracts from all three types of infant. It therefore seemed that there was no lack of suitable nutrients for this organism in the faeces of the breast-fed infant.

Investigation of the influence of pH showed that the pH of stools from infants suffering from gastro-enteritis from whom these organisms were isolated ranged from 6 to 9, a range similar to that found in healthy artificially fed infants. The influence of pH on the growth of these organisms *in vitro* was investigated in a simple synthetic medium, in nutrient broth and in nutrient glucose broth. In all three media, the growth of each of the four strains was negligible when the initial pH of the medium was below five, and optimal when the pH was above seven. It was therefore evident that the well-known low pH of the breast-fed infant's stool (a range of values from 4.7 to 5.1 was reported by F. F. Tisdall and A. Brown⁴ in 1924) would inhibit the growth of these organisms. Moreover, it was found that formic acid, which is toxic to *E. coli* at a low pH, was present in much higher concentration in the faeces of the breast-fed than in those of artificially fed infants.

Ross and Dawes draw attention to the fact that in these *in-vitro* experiments glucose had a stimulating effect on the growth of the organisms. This, they point out, is important when it is remembered that oral feeds of glucose and saline solution are commonly used in the treatment of infantile gastro-enteritis. In healthy infants, glucose would be rapidly absorbed from the upper part of the intestinal tract, which is normally free from coliform organisms. In the presence of infantile gastro-enteritis, however, not only may there be invasion of the upper part of the intestinal tract by coliform organisms, but also intestinal hurry may carry a considerable quantity of glucose further down the intestines. A combination of these factors may well stimulate the growth of a specific strain of *E. coli*. Attention is also drawn to the fact that even the administration of a single supplementary feed of a preparation of cow's milk causes an immediate rise in the pH of the faeces. Any resistance to types of *E. coli* based on a low intestinal pH will thus last only during the period of complete breast-feeding. Evidence for the transient nature of this resistance was found in the fact that in infants with gastro-enteritis, no correlation could be found between the duration of previous breast-feeding and the severity of the illness. This accords with the report by Stewart and Westropp that gastro-enteritis was rare in infants receiving nothing but breast-milk, but that there was no difference in sickness experience between those weaned early and those weaned late.

¹ Brit. M. J., June 28, 1941.

² Ibidem, December 4, 1948.

³ Lancet, May 15, 1954.

⁴ Am. J. Dis. Child., April, 1924.

Referring to the prevalence of cross-infection with specific types of *E. coli* among artificially fed babies in paediatric units, Ross and Dawes state that the ideal solution to this problem is to feed these babies with human milk. Where this is impossible, an attempt to attain an acid pH in the intestine assumes considerable importance. Oral feeds of lactose take from one to four weeks to reduce the pH of the faeces, and the reduction is only partial and temporary; but even this may, in certain circumstances, be advantageous. However, it seems that in human milk there is another factor besides lactose which is necessary for the maintenance of an acid pH and a lactobacillary flora. Ross and Dawes refer to György's finding in human milk of a specific growth factor for a strain of *Lactobacillus bifidus*. This factor contains glucosamine, fucose and galactose. It is suggested that this factor may also be necessary for the maintenance of a lactobacillary flora, and that the production of such a flora leads to the development of an acid intestinal pH.

HISTAMINE.

A MEDICAL STUDENT could be expected to know that histamine is the amine of histidine and that it is a naturally occurring constituent of the body present in many tissues, and one of the most active substances known. He should also know the main pharmacological effects of histamine in the body; but if he was asked what is the physiological function of histamine and what its mode of action in the skin, the skeletal muscles, the nerve fibres, the wall of the digestive tract, the liver, the lungs, he could not answer. It is not yet possible to give a definite and satisfactory answer to the question, but W. Feldberg, largely from the results of his own experiments, has attempted to set out what is known of its mode of production and its functions.¹

During the past few years numerous substances have been studied which liberate histamine from the tissues: the so-called histamine liberators or histamine releasers. They are chemical compounds capable of releasing histamine without producing visible damage to the tissues. In this respect they differ from snake venom, bee venom and trypsin, which have long been known to liberate histamine, but act by destroying or digesting the tissues. The histamine in the tissues is somehow linked to the proteins and lipins. On destruction of either the proteins or the lipins the histamine is set free. Trypsin and some snake venoms digest the proteins. Other snake venoms as well as bee venom are lecithinases and split off oleic acid from lecithin-producing lysolecithin which dissolves the tissue lipins and so sets free histamine. The histamine liberators, on the other hand, release histamine without causing these deep structural changes in the tissues. The first substance of this kind to be used was *d*-tubocurarine. A great many such substances are now known, and as many of them are diamines or monoaminidines or diaminidines, it has been suggested that they act by displacing histamine from its attachment. The most active substance known is called compound "48/80" and it is active in fractions of a microgramme. These substances have greatly facilitated the study of histamine. On injection, they produce the pharmacological effects of histamine, but whereas histamine acts immediately, there is a delay of twenty to twenty-five seconds before the effect of the histamine liberators is seen. That they do liberate histamine can be demonstrated by measuring the histamine in venous effluent. Histamine is not liberated with the same ease in different tissues. The histamine in skin and skeletal muscles is more sensitive to liberators than that of any other organ.

Histamine can be completely depleted from a perfused isolated skin flap, and Talesnik and Feldberg succeeded in practically depleting the histamine of the whole skin of intact rats. It takes many weeks for the histamine to be replaced. Where in the tissues is the histamine? There is a very strong positive correlation between the histamine

content of a tissue and its mast cell population. Riley and West showed (a) that ox pleura is packed with an enormous number of mast cells and contains between 200 and 300 microgrammes per gramme of histamine, (b) that the mast cell population of many tissues is small in very young mammals but increases in adult animals and so does the histamine content, (c) that mast cell tumours yield extremely high histamine values. One human tumour contained nearly 1.0 milligramme of histamine per gramme of tumour. Very little is known about the mast cells. They occur, often in clumps, in the connective tissue around small blood vessels and contain basophile granules similar to the basophile cells of the blood. The granules consist largely of heparin, and there is a close connexion between the release of histamine and heparin, for instance, in peptone and anaphylactic shock. A colloidal dye, pontamine sky blue, was injected intravenously; drugs were then injected intradermally. If the drugs caused increased permeability there was local exudation of dye shown by local blueing. With histamine local blueing occurred throughout the whole thickness of the skin; with "48/80" the blueing occurred where plexuses of vessels were situated. Not all the histamine, however, comes from mast cells. The release of histamine is the first reaction or "defence mechanism" of the human skin to any kind of injury or irritation and leads to the triple response—local redness, weal and surrounding flare. Experiments with intravenous or parenteral injections of histamine liberators have brought out some interesting facts in relation to the reactions in the skin. The increased permeability of the skin vessels does not occur evenly over the whole surface of the body, but shows certain regions of predilection, and these skin areas are characterized by a high histamine content. In the dog, these areas were the bristle-bearing area, the eyelids, the ears, the lips and the areola of nipples. The question arises whether similar regional differences exist in the human, and, if so, whether they can be related to regional differences of allergic and other dermatological manifestations. Rats are sensitive to egg white and on intraperitoneal injection show itching and oedema of the face and paws. When the egg white was injected into rats depleted of skin histamine no oedema was seen. When rats were injected with hæmatoporphyrin and exposed to light they became restless and started to scratch violently; some developed intense cyanosis, some died. Rats after prior treatment with "48/80" and depletion of their skin histamine, when injected with hæmatoporphyrin showed definite resistance to light.

In each species of animal so far examined there is a definite pattern of skin reactions apparently associated with regional variations in skin histamine. There is abundant evidence that the itching of the skin, due to causes acting locally, is the result of the release of histamine. This is seen in too large a dose of pollen extracts in desensitization, in jaundice, in the effects of itching powders *et cetera*. Very little is known about the effects of release of histamine in the liver and lungs. One can assume that there is a constant release of both heparin and histamine from the tissue mast cells, which not only maintains the fluidity of the blood and enhances fat metabolism, but also helps vascularization and other local regulatory processes. The walls of the stomach and intestines have a high content of histamine and are apparently very resistant to the known histamine liberators. The ileum of the guinea-pig is very sensitive to histamine, but rather large doses of "48/80" are required to produce motor effects. It cannot, however, be said yet that the release of histamine by "48/80" is an accentuation of a physiological phenomenon. Injection of cobra venom, bee venom and large doses of histamine causes intense hæmorrhagic congestion of the intestinal mucosa in dogs, and this may be the equivalent in the mucosa of the triple reaction in human skin.

Histamine is one of the strongest secretory stimuli for acid secretion of gastric juice; it also causes secretion of mucus in the stomach and is a powerful stimulus for secretion of *succus entericus*. It could therefore well play a physiological role in the secretion of these juices. There is some evidence that the action of gastrin is due to the liberation of histamine. Histamine in the intestinal wall

¹ J. Pharm. & Pharmacol., May, 1954.

probably represents a pre-secretory stage of histamine passing from the blood to the intestinal lumen. The strong secretory activity of histamine would serve the purpose of getting rid of surplus histamine entering the circulation. In the intestine histamine is acetylated and so rendered ineffective. Gastric juice, whatever the stimulus, always contains histamine.

COCONUT WATER.

THE refreshing qualities of coconut water, especially that produced by the unripe coconut, have brought it deserved favour in the eyes of the thirsty traveller, but its chemical and biological properties have probably not received the attention that they merit. As long ago as 1891, Van Slyke pointed out that fresh coconut water was sterile and could be used as a bacterial culture medium. He also made a thorough chemical analysis of coconut water and found a sugar content which varied between 3.56 and 4.58 grammes per hundred millilitres, and noted that glucose was present in the unripe fruit, whereas sucrose was the predominant carbohydrate in fluid from the older nuts. Ben Eiseman,¹ in quoting Van Slyke's findings, states that they have been corroborated many times since. He also has confirmed the sterile character of coconut water drawn off from the coconut under aseptic conditions; the fact that coconut water is a good bacterial medium is emphasized by his finding that even the slightest break in aseptic technique resulted in luxuriant bacterial growth. Moreover, several samples of coconut water from cracked nuts showed signs of bacterial and fungoid contamination. In a test for hæmolytic activity, he found that coconut water undiluted failed to produce hæmolysis of human red blood cells, and it was not until the coconut water had been diluted with three to four times its volume of distilled water that hæmolysis took place. Electrolyte analysis showed that coconut water had the characteristics of hypotonic intracellular fluid. The total cation or anion content was a little over one-half that of human plasma. The pH ranged within very narrow limits and averaged 5.6. The buffering capacity was low because the anions were largely chloride and phosphate; only traces of bicarbonate were present. The protein content was consistently low, ranging from 40 to 450 milligrammes per 100 millilitres. Potassium formed the largest proportion of the coconut water cation, just as it does in the intracellular fluid of man. The concentrations of magnesium and calcium were also high, whereas only traces of sodium were present. Other investigators have shown that although the protein content is low it contains a good selection of nutritionally important amino acids. It is not, however, a good source of vitamins, containing only nicotinic and pantothenic acids in appreciable concentrations. Amylase, diastase, catalase and peroxidase have been found, but are not present in physiologically important concentrations. The fat content increases with ripening. Unripe fruit contains as little as 0.084 gramme per 100 millilitres.

Two medical roles that have been suggested for coconut water are, first, as an adjuvant in infant dietetics and, second, as a fluid for intravenous infusion. In 1942, E. Soto Pradera, E. Fernandez and O. Calderin² published an account of their analysis of coconut water from the unripe coconut and of their experience of its use in the two roles mentioned. They listed a number of properties of coconut water which made it seem reasonable to them to use it in mixtures with evaporated milk in the feeding of infants. They pointed out that it was a natural sterile and acid solution containing salts, proteins, carbohydrates and neutral fats. An examination of its detailed content indicated its qualities as a nutriment, and particularly the amino acids present showed the importance of its derived proteins. Its organic acidity implied the possibility of modification of the buffer substances in milk, thereby reducing coagulin tension. Its sugars and fats,

though occurring in only small proportions, might increase its energy-producing value a little. The relatively limited experience recorded in the paper appeared to produce satisfactory results, and the mixtures were tolerated well by the infants. The increase in weight and general condition of the infants to whom it was given were excellent. However, Pradera and his colleagues emphasized the fact that the results should not be construed as meaning that such mixtures might be employed regularly and indiscriminately. The suggestion appears to be that, containing a natural acid element, coconut water can be used as a substitute for the usual organic acids when acid milk mixtures are required. Pradera and his colleagues also described their preliminary experience in the subcutaneous and intravenous injection of coconut water. It is this possibility, which has been further developed by Ben Eiseman in the paper previously referred to. He has found experimentally that rabbits and dogs tolerated the infusion of large amounts of coconut water and showed no clinical, chemical or microscopic evidence of toxic effects after "acute and chronic" administration. No evidence of antigenicity has been noted. In this respect, Eiseman refers back to the work of Pradera and his colleagues, who stated that coconut water did not contain complex molecule proteins and were therefore of the opinion that it was incapable of producing anaphylactic shock. Eiseman's experience with animals and with 21 human subjects to whom he has given coconut water intravenously supports this view. However, he concludes that the number of patients tested is too small to permit of sweeping generalizations, and a more extensive clinical trial is now under way. The other potential hazard relates to the high potassium content of coconut water. Eiseman states that although no evidence of hyperkalemia has been noted in the patients so far studied, all have had adequate renal function at the time of investigation. Whether intravenous administration of coconut water will be tolerated by dehydrated, acidotic or oliguric patients cannot be answered at present. It is possible that the high concentrations of calcium and magnesium found in coconut water may increase the body tolerance to relatively high calcium levels, as some investigators have reported in other connexions.

It is an obvious comment that there are more satisfactory substances than coconut water readily available for intravenous infusion in most normally equipped medical centres. On the other hand, as Eiseman points out, in many of the under-developed areas of the world it is impossible locally to prepare solutions sufficiently pure to be employed for intravenous infusion. Under such circumstances, and in certain emergencies, it is comforting to know that in coconut water from intact unripe coconuts Nature provides a suitable sterile fluid all ready for use in hermetically sealed ampoules.

SOME COMPARATIVE STUDIES WITH CORTISONE.

A GOOD DEAL of publicity in the lay Press has preceded the arrival in Australia of the full report by a joint committee of the Medical Research Council and Nuffield Foundation³ in which a comparison is made of the effects of cortisone and aspirin in the treatment of patients with rheumatoid arthritis in the early stages. It needs to be realized that the comparison relates only to a limited phase of the disease and the interpretation of the results has already been subjected to severe criticism, but the findings are, nevertheless, of considerable interest. The aim of the trial was to measure the therapeutic effects of cortisone treatment upon the rheumatoid process while that process is still uncomplicated, either by severe anatomical changes in the joints or by metabolic or endocrine disturbances resulting from a prolonged and debilitating disease. It was considered out of the question, on ethical grounds, to use a control group receiving dummy treatment; so control treatment was carried out with aspirin, a drug usually regarded as efficacious in the treatment of rheumatoid arthritis. Both groups received the same basic treatment

¹ Arch. Surg., February, 1954.

² Am. J. Dis. Child., December, 1942.

³ Brit. M. J., May 29, 1954.

regime of splints, physiotherapy et cetera. Of a total series of 61 patients, 30 received cortisone and 31 received aspirin. Treatment and observation extended over a year. It is stated that the two groups have run a closely parallel course in nearly all the recorded characteristics—namely, joint tenderness, range of movement in the wrist, strength of grip, tests of dexterity of hand and foot, and clinical judgements of the activity of the disease and of the patient's functional capacity. The haemoglobin level and blood sedimentation rate were slightly more favourably influenced by cortisone, but in no other respect did the two groups differ materially according to the report. It is considered that for practical purposes there was surprisingly little to choose between cortisone and aspirin in the management of these 61 patients in the early stages of rheumatoid arthritis.

Criticism of this report was quickly forthcoming, and a number of correspondents in the *British Medical Journal* have thrown grave doubts on the soundness of some of the standards used in assessing results and more particularly on the validity of the interpretation of the results in the report. Working from the basic data of the report, G. E. Lexton and D. Le Vay¹ have managed to draw materially different conclusions, which favour the efficacy of cortisone. It is too soon for this criticism to have drawn a reply from the committee which compiled the report, but it must be awaited with interest. It is also of interest, in passing, to recall in the light of the report the work recently mentioned in these columns² in which it was shown that the therapeutic efficacy of the salicylates in relation to rheumatoid arthritis cannot be regarded as resulting from an increased production of adreno-cortical steroids by either direct or indirect stimulation.

It seems clear also that phenylbutazone, which has achieved a reputation as a drug efficacious in the relief of rheumatoid arthritis, does not produce its effects either directly or indirectly through stimulation of the adrenal cortex. However, B. B. Brodie et al.³ in another comparative study, have been able to show that it produces antirheumatic effects in cases of rheumatoid arthritis which are comparable with those of cortisone and corticotropin. They point out further that, like cortisone and corticotropin, phenylbutazone causes urinary retention of sodium, chloride and water, and may reactivate peptic ulcers; but unlike cortisone, it does not affect the excretion of potassium, nor does it cause eosinopenia or increased ketosteroid excretion. Worthy of more thought is the comment of Brodie and his colleagues that the encouraging results obtained with phenylbutazone in this comparative study should serve to direct further investigation towards other non-steroidal compounds which may exert desirable local tissue effects without the hormonal imbalances that may accompany the administration of cortisone and corticotropin. It might be reasonable also to hope for compounds lacking the undesirable side effects of phenylbutazone.

Although many workers in this field draw a firm line between rheumatic fever and rheumatoid arthritis, it may not be out of place to refer to yet another comparative study, in which H. B. Houser, E. J. Clark and B. L. Stolzer⁴ compared the effects of aspirin, corticotropin and cortisone on the acute course of rheumatic fever in a series of 148 young adult males. Fever, joint pain and objective evidences of joint involvement were relieved most promptly with aspirin; corticotropin was more effective in this respect than cortisone. Apart, however, from the promptness of relief, the three drugs differed little in their effects on the symptoms. The pattern of response of the erythrocyte sedimentation rate was different in each of the three therapy groups. The significance, if any, of the respective effects of the three drugs on rheumatic carditis cannot be assessed on the data available at this stage, but a long-term follow-up study may reveal something of interest. Other comparative findings are described but need not detain us now. It is as well, however, to note the general conclusion of Houser, Clark and Stolzer, which

is that the over-all effect of each of the drugs leaves much to be desired in the treatment of acute rheumatic fever and that adequate therapy for this disease is not available at present.

BORIC ACID.

THAT boric acid is potentially a poison which may have fatal results has been known for a long time, but it continues to be used particularly for infants from the traditional belief that it is a mild antiseptic and being mild must also have low toxicity.

Two articles have appeared recently which stress again the fact that boric acid may be very dangerous. These are by R. B. Goldbloom and A. Goldbloom and by H. G. Poncher.⁵ From their own experience and from a review of 105 cases in the literature of which 60% were fatal, Goldbloom and Goldbloom present a clear picture of boric acid poisoning which is deserving of study by medical practitioners. The risk is greatest in infancy and poisoning most frequently occurs from oral ingestion or application to raw skin surfaces. Apparently there is little risk from the application of boric acid to intact skin surfaces. The clinical manifestations of poisoning are shown by convulsions, delirium, coma, diarrhoea and vomiting, and intense and generalized erythema followed by intense desquamation. At autopsy the most notable changes are seen in the brain with oedema and congestion, in the liver and kidneys with degeneration, and in the gastro-intestinal tract with inflammation. Probably milder cases of poisoning are not uncommon and Poncher writes:

It is incredible that a drug with such toxic propensities and doubtful therapeutic value should continue to enjoy such popularity in the armamentarium of so many physicians and occupy such a prominent place in the home medicine cabinets. . . . Boric acid should be replaced in medical practice with more efficient and safer medication.

INFECTION-PROMOTING ACTIVITY OF LEVAN AND DEXTRAN.

PARTIALLY degraded dextrans and levans are being increasingly used as plasma volume expanders in the treatment of shock and it is essential that the preparations used should not cause undesirable side effects. S. Hestrin, M. Shilo and D. S. Feingold have reported that native preparations of dextran and levan given intravenously powerfully promote an abdominal Salmonella infection in the mouse and that in both instances the infection-promoting activity is lost when the polysaccharide is partially hydrolysed.⁶ They have determined the effect of different degrees of polymerization on this property. Decrease in the molecular weight by acid hydrolysis resulted in a rapid decline of the infection-promoting activity of intraperitoneally administered levan. Native dextran resisted hydrolysis when heated at pH 2 for sixty minutes at 100° C. and the infection-promoting activity was not affected, so that longer hydrolysis and careful fractionation are necessary. Other workers have shown that the presence of high molecular fractions is undesirable for other reasons. A commercial preparation of hydrolysed dextran for intravenous injection was found not to have any measurable effect. Bacterial invasion of tissues has been found to be a contributory factor to the development of irreversibility in shock. This circumstance aggravates the hazards entailed in the injection of an infection-promoting polysaccharide into the body. The authors suggest that there should be routine controls of the infection-promoting activity of clinical dextran and levan preparations. The authors discuss the reason for the activity of the higher polysaccharides, but come to no clear conclusion.

¹ *Brit. M. J.*, June 26, 1954.

² *M. J. AUSTRALIA*, June 19, 1954.

³ *Am. J. Med.*, February, 1954.

⁴ *J. Pediat.*, December, 1953.

⁵ *Brit. J. Exper. Path.*, April, 1954.

Abstracts from Medical Literature.

MEDICINE.

Emphysema Treated by Pneumoperitoneum.

B. MANN AND E. A. MURPHY (*Thorax*, March, 1954) recorded the maximum breathing capacity and vital capacity of 10 patients suffering from advanced pulmonary emphysema during a period of eleven months before, during and after the abandonment of pneumoperitoneum treatment. Only one patient was consistently improved symptomatically and in maximum breathing capacity during the treatment. The authors believe that the favourable results reported by others are probably attributable to extraneous influences on pulmonary function and to increased efficiency and mental coordination in the performance of tests.

Pathogenesis of Systemic Lupus Erythematosus.

G. C. GOLD (*Brit. J. Dermat.*, February, 1953) reviews the evidence establishing the relationship of systemic with chronic discoid lupus erythematosus. He expresses the view that the initiating antigen which stimulates a cutaneous symptom of discoid lupus erythematosus is frequently streptococcal, and that tuberculosis is occasionally responsible; also, that other antigens, infective in nature and possibly non-infective, may occasionally be culpable. He states that recently it has been found that hematogenous and biological changes, previously considered to be typical of the systemic form, are being found as well in the discoid form; thus a raised sedimentation rate, anaemia and leucopenia are often seen, serum protein estimations may reveal hemoglobinemia, and the urine may occasionally contain albumin. The strange association of a chronic benign process with a violent malignant one at once differentiates lupus erythematosus from erythema nodosum and erythema induratum, neither of which ever develops into a comparable systemic and fatal illness. It is attractive but premature to suggest that some substance associated with the pituitary-adrenal axis is the natural restraining force effectively applied in patients suffering from the discoid disease. An intimate association of this disease with endocrine balance is also suggested by the striking number of females affected compared with males, a sex distribution similarly evident in erythema induratum and to a less extent in adult erythema nodosum. It would seem that a basic feature predisposing to the development of this disease is a lability of endocrine balance. Injections of foreign substances may instigate this process. Medicines taken orally occasionally precipitate the systemic disease, more particularly if the discoid form has previously been present. Amongst these culpable are iodine, thiourea and deoxycortone, but predominantly important are gold and sulphonamides. After investigation, the author is satisfied that the following hematological abnormalities are characteristic in systemic cases: anaemia, leucopenia, occasional depression in the number of platelets, "false

positive" Wassermann and Kahn reactions, ability of the patients to form multiple antibodies to transfused blood, fibrinolysis during the incubation of clotted blood at 37° C. being occasionally complete, hyperglobulinemia with reversal of the normal albumin/globulin ratio, the diagnostically important "L.E. cell". There is factual evidence, from studies of the blood, of the presence of abnormal γ -globulins, of a ready tendency to develop antibodies and of development of auto-antibodies—not a surprising finding in view of the frequency of drug reactions and other sensitivities exhibited by these patients. The author puts forward the hypothesis that systemic lupus erythematosus is a disturbance of the immune mechanism. This state arises through lack of adequate restraint normally supplied by the pituitary-adrenal axis, and allows development of useless antibodies and even auto-antibodies. There is no biochemical, hematological or histological test which can differentiate with certainty between localized and systemic types of lupus erythematosus. The distinction is a clinical one.

ACTH and Stevens-Johnson Syndrome.

R. VANDER MEER, D. E. WILSON AND J. E. BULTHUIS (*New England J. Med.*, May 7, 1953) report the therapeutic effect of ACTH in a case of Stevens-Johnson syndrome (*erythema multiforme exudativum*). The patient, a boy of sixteen years, was acutely ill when admitted to hospital with erythematous lesions on his legs, photophobia, injected and swollen conjunctival ulcers on both sides of the nasal septum and ulceration of the lips as well as of the buccal mucous membrane. During the first four days in hospital the patient received large doses of penicillin, chloramphenicol, "Bendryl" and ophthalmic ointments. The temperature remained raised up to 104° F. The throat and buccal mucosa showed more severe ulceration. Purulent urethritis was noticed on the second day. The skin lesions increased rapidly. The patient was then given 25 milligrammes of ACTH every six hours. The response was dramatic. Within twelve hours he was able to swallow. No new skin lesions appeared. The temperature dropped to normal within six hours and remained normal. Stomatitis diminished more slowly, and all lesions were healed four days after ACTH therapy was started. Administration of ACTH was continued for a total of ten days. The authors state that the diagnosis of this condition may, during the early stages, be easily confused with Vincent's angina, infectious mononucleosis, leucemia, gonorrhoea, arthritis, conjunctivitis and other infectious diseases. When the patient fails to respond to antibiotics and more symptoms progressively develop, the true syndrome usually becomes clear.

Bacillus Anthracis.

W. P. BOGER (*Arch. Dermat. & Syph.*, June, 1953) states that 29 strains of *Bacillus anthracis* have been tested *in vitro* for susceptibility to seven antibiotics: aureomycin, chloramphenicol, neomycin, penicillin, polymyxin, streptomycin and oxytetracycline. Uniform sensitivity of all strains to aureomycin and oxytetracycline ("Terramycin") was observed; on the other hand, all were resistant to polymyxin. The greatest variation in sensitivity within

these strains was observed with reference to penicillin. The degree of sensitivity of these strains to streptomycin and neomycin was similar, and these strains may be regarded as moderately sensitive to these agents. Clinical experience has shown that aureomycin, chloramphenicol, penicillin and oxytetracycline are of value in the treatment of cutaneous anthrax, and laboratory observations of *in-vitro* susceptibility to these antibiotics correlate well with these therapeutic results. It might therefore be predicted, on the basis of the laboratory tests here reported, that streptomycin and neomycin would prove of value in the treatment of cutaneous anthrax.

Diabetic Neuropathy.

M. MENCER MARTIN (*Brain*, December, 1953) has made a clinical study of 150 cases of diabetic neuropathy. He states that it is most common in those who have neglected diabetic control. Symptoms and signs were those of peripheral nerves only. Neuropathic foot lesions were common. The chief therapeutic measure is adequate diabetic regulation. Disturbances of vasomotor function are so common that nerve involvement must be regarded as very frequent in diabetic patients.

Causation of Syringomyelia.

M. G. NETSKY (*Arch. Neurol. & Psychiat.*, December, 1953) reports eight cases of syringomyelia with necropsy findings. He correlates pathological findings with clinical history and gives reasons for a general theory of pathogenesis. He considers that there are intramedullary vascular birth anomalies and the vessels become occluded or ineffective. Destruction and cavitation occur. Gliosis or connective tissue proliferation may follow. Infarction may take place.

Inheritance of Multiple Sclerosis.

R. MULLER (*Arch. Neurol. & Psychiat.*, December, 1953) surveys the history of 810 patients with multiple sclerosis. He states that, using Stromgren's "exact" method of statistical calculation, he found that his data gave no support to the concept that inheritance is involved.

Dangers of Intrathecal Injection of Detergents.

R. M. PADDISON AND B. J. ALPERS (*Arch. Neurol. & Psychiat.*, January, 1954) report a severe, extensive and finally fatal case of adhesive arachnoiditis following induction of spinal anaesthesia. They attribute the condition to use of a detergent in preparation of apparatus and present evidence to show that such compounds have a profound biological activity which can produce severe neural damage. They advise caution in the use of detergent-cleaned apparatus for intrathecal injections.

The Electrocardiogram in Periodic Paralysis.

L.-H. BLOMBERG AND T. LINDQVIST (*Acta med. Scandinav.*, 147, 1954, 437) report electrocardiographic findings and serum potassium levels in two patients with periodic paralysis. One patient during paralytic seizures had electrocardiographic alterations characteristic of hypokalaemia. The other had similar changes during the height

of the paralytic attack, but during recovery after the administration of potassium chloride the electrocardiograms resembled those of hyperpotassemia. This type of tracing appeared at serum potassium values lower than normal, and the level never exceeded the normal in each case. The S-T segment was elevated during recovery from the attack. These observations are discussed with regard to the electrocardiographic changes observed in other cases of periodic paralysis, and in cases of hypopotassemia and hyperpotassemia associated with other disease.

Hexamethonium Chloride and Blood Pressure during Exercise.

B. HOOD, S. BJÖRK, G. ANGÉVALL AND H. RUDBACK (*Acta med. scandinav.*, 147, 1953, 213) studied the blood pressure and pulse rate in a series of hypertensive patients before, during and after exercise on a bicycle ergometer. It was shown that the blood pressure peak reached during exercise was lower after the administration of hexamethonium than in the controls. After work there was a considerable and long lasting drop in blood pressure in subjects in a sitting position. The pulse rate also did not rise during exercise to the same extent as it did in the controls. These findings suggest that under the influence of hexamethonium, vascular stress of exercise may be lessened.

Blind Ileal Loops and Anæmia.

M. SIURALA AND W. J. KAIPAINEN (*Acta med. scandinav.*, 147, 1953, 197) report two cases in which previous operations have resulted in the formation of blind loops in the lower part of the ileum. The patients developed macrocytic megaloblastic anaemia with free hydrochloric acid in the gastric juice. A good hematopoietic response was obtained with "Aureomycin" and "Terramycin". Subsequently at operation the large blind loops were eliminated. The anaemia did not recur during the period of follow-up.

Cogan's Syndrome.

H. STEVENS (*Arch. Neurol. & Psychiat.*, March, 1954) reports the seventeenth recorded case of Cogan's syndrome. He states that it is the first reported case in a child. There was the characteristic triad of bilateral interstitial keratitis, involvement of both components of the eighth nerve with progressive bilateral deafness, and consistent absence of evidence of syphilis. Oral administration of cortisone mitigated the ocular signs.

Collagen Disease and Hydralazine.

H. MITCHELL PERRY AND H. A. SCHROEDER (*J.A.M.A.*, February 20, 1954) report on a syndrome which developed in 8.1% of 211 patients being treated with hydralazine ("Apresoline") for hypertension. The duration of treatment varied from two to twenty-two months, and the total ingestion of "Apresoline" ranged from 25 to 350 grammes. In mild cases of toxicity, arthralgia and laboratory abnormalities of hepatic function appeared. In more severe forms the condition simulated acute rheumatoid arthritis. The fully developed picture was indistinguishable from disseminated lupus erythematosus, and in one case "LE" cells were found in the blood. The syndrome appeared only in those patients whose hyper-

tension was well controlled. The disease regressed when hydralazine therapy was stopped, but recurred when it was resumed. Chemical analogues of hydralazine caused the same symptoms in one patient as hydralazine itself. Three case histories illustrate the clinical and laboratory findings.

"Banthine" and Peptic Ulcer.

P. BECHGAARD, H. O. BANG, A. LEVIN-NIELSEN AND E. TOBIASSEN (*Am. J. Digest. Dis.*, February, 1954) report the results of a clinical trial in which, in addition to the usual dietetic treatment, 68 patients were treated with "Banthine", 50 milligrammes four times a day for one year, and 66 with a placebo. All were treated as out-patients. Of those treated with "Banthine", 65% were improved or cured clinically as compared with 56% treated with the placebo. Radiologically, the results were 23% and 13% cured respectively. It is concluded that while effective in relieving symptoms, "Banthine" alone exerts no distinct curative effect on peptic ulcer.

"Mysoline" in Epilepsy.

D. SCIARRA, S. CARTER, C. T. VICALE AND H. H. MERRITT (*J.A.M.A.*, March 6, 1954) report the results of treating with "Mysoline" 121 patients suffering from epilepsy who were also receiving other standard methods of treatment without completely controlling the disease. Its anticonvulsant effect could be evaluated in 72 patients who were observed for periods ranging from one to eighteen months. In all but seven cases, primidone ("Mysoline") was given in conjunction with one or more of the standard anticonvulsant drugs. Seizures were completely controlled in 10%, reduced in frequency in 43% and unchanged in 47%. The greatest benefit occurred when the seizures were of the grand mal, psychomotor, minor or focal types. No improvement was noted in any of the patients with petit mal. Side effects occurred in 65 cases, but none were serious. Drowsiness and ataxia were the two most frequent symptoms, and made it necessary to discontinue the administration of primidone in 25 cases.

Hypothermia in Cardiac Surgery.

H. SWAN *et alii* (*J.A.M.A.*, November 21, 1953) report their experience in the management of 15 patients with congenital heart disease treated by hypothermia and direct surgical attack on the malformation. In preliminary work it was shown that respiratory alkalosis and a fall in serum potassium level as a result of cooling and hyperventilation are the principal factors in producing ventricular fibrillation during the cooling of the body in ice water. By controlling these factors it was found possible to use hypothermia in human beings without producing ventricular fibrillation. The malformations treated were pulmonary stenosis, Fallot's tetralogy, transposition of the great vessels and atrial septal defect. When cooling of the body to an appropriate level (22° to 28° C.) was achieved, it was possible to interrupt the venous return completely for as long as eight and a half minutes, empty the heart of blood and carry out correction of the malformations under direct vision. One patient died from ventricular standstill and fibrillation; the remainder

recovered. Auricular fibrillation commonly occurs during cooling below 28° C., but usually disappears when the patient is warmed up. Most of the patients were children, but there was one twenty-eight-year-old patient with Fallot's tetralogy. Save for the patient who died, all the patients have had excellent clinical results. Hypothermia was induced during anaesthesia by immersing the patient in a tub full of ice water. Warming was achieved in the tub with warm water. Prevention of shivering and hyperventilation were very important aspects of the cooling technique. Prevention of air embolism when the circulation was started again was essential to success.

Regional Ileitis and Ulcerative Colitis.

S. WARREN AND S. C. SOMMERS (*J.A.M.A.*, January 16, 1954) discuss the pathology of regional ileitis and ulcerative colitis. They found in an investigation that regional ileitis was restricted to the small intestine in 83% of cases, and ulcerative colitis to the large intestine in 60% of cases; in 34%, ulcerative colitis involved the ileum. The authors state that in regional ileitis the main condition is a progressive granulomatous lymphangitis. In ulcerative colitis the main changes are an exudative inflammatory condition mainly restricted to the mucosa and submucosa of the colon.

Cutaneous Tuberculosis.

R. E. HOLSINGER AND J. E. DALTON (*J.A.M.A.*, February 6, 1954) discuss isoniazid therapy for cutaneous tuberculosis and sarcoidosis. They state that this form of treatment for these conditions has been unsatisfactory. Amithiozone ("Tibione") is too toxic, so are iproniazid and viomycin. Pyrazinamide and candidin are being investigated. "Aureomycin", "Terramycin" and erythromycin are ineffective. Isoniazid killed tubercle bacilli *in vitro*. In man, four milligrammes per kilogram daily were effective in the treatment of tuberculosis of the skin. In some cases, one gramme of streptomycin daily was given intramuscularly with benefit.

Leuchæmia.

W. DAMESHEK (*New England J. Med.*, January 28, 1954) discusses the outlook in leuchæmia. He states that the outlook is bad. Various leuchæmias are mentioned under the titles granulocytic, lymphocytic, monocytic and plasmocytic. The causes are unknown, but possible causes are discussed. In treatment, arsenic and X rays are mentioned, but the main emphasis is on aminopterin, which is an amino acid analogue of folic acid. This is useful for children, but dangerous for adults. In children, with the lymphocytic type, it often induces remissions if associated with ACTH. However, the prolongation of life is brief. Triethylene melanine (TEM) used for the treatment of chronic lymphatic leuchæmia and lymphosarcoma may induce a remission if used in doses of 2.5 milligrammes three times in the first week and twice in the second week. However, the author realizes that spontaneous remissions occur, and does not claim any great success for these or other drugs. He points out also their toxic effects.

British Medical Association News.

NEW SOUTH WALES BRANCH NEWS.

A CEREMONY was held on the afternoon of Sunday, June 27, 1954, at the Robert H. Todd Assembly Hall, British Medical Association House, 185 Macquarie Street, Sydney. A tablet containing the names of 39 members of the New South Wales Branch of the British Medical Association who had lost their lives in the war of 1939 to 1945 was unveiled by His Excellency the Governor of New South Wales, Sir John Northcott. Among those present, as well as members of the Branch in academic dress, were relatives of the men whose names are inscribed on the tablet. Dr. T. Y. NELSON, the President of the Branch, was in the chair.

Dr. Nelson, the President, said that it was the second occasion on which members of the Association had met together to unveil a memorial to colleagues who had lost their lives in war. After the first World War, the Council had erected a memorial tablet in the old Elizabeth Street building, and when the new building was completed the tablet had been transferred to it, and set up on the first floor landing. The Council had now erected a replica of it on the opposite wall; on it were inscribed the names of 39 members of the Association who had lost their lives during the second World War. Dr. Nelson then referred to achievements of the medical services in the South African War, and said that members of the medical profession could look back with pride on the manner in which the traditions built up had been upheld. The tablet erected had been surmounted by a light, which would be lit immediately after the unveiling. It would continue to burn always, as a symbol that the memory of the men whose names were on the tablet would never be dimmed.

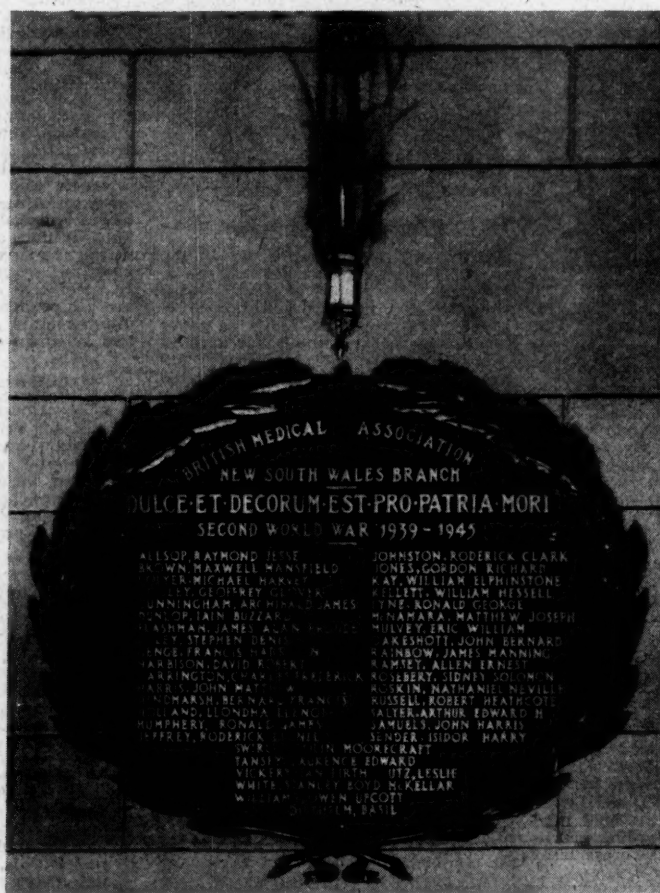
Dr. Nelson then asked those present to stand while Dr. John Hunter read aloud the names of the 39 men inscribed on the memorial. The names are as follows: Raymond Jesse Allsop, Maxwell Mansfield Brown, Michael Harvey Colyer, Geoffrey Glover Cooley, Archibald James Cunningham, Basil Diethelm, Iain Buzzard Dunlop, James Alan Froude Flashman, Stephen Denis Foley, Francis Harrison Genge, David Robert Harbison, Charles Frederick Harrington, John Matthew Harris, Bernard Francis Hindmarsh, Llondda Llenoi Holland, Ronald James Humphery, Roderick Lionel Jeffrey, Roderick Clark Johnston, Gordon Richard Jones, William Elphinstone Kay, William Hessel Kellett, Ronald George Lyne, Matthew Joseph McNamara, Eric William Mulvey, John Bernard Oakeshott, James Manning Rainbow, Allen Ernest Ramsey, Sidney Solomon Rosebery, Nathaniel Neville Roskin, Robert Heathcote Russell, Arthur Edward H. Salter, John Harris Samuels, Isidor Harry Sender, Colin

Moorecraft Swirlies, Laurence Edward Tansey, Leslie Utz, Ian Firth Vickery, Stanley Boyd McKellar White, Owen Upcott Williams.

After the names had been read, Dr. Nelson asked His Excellency the Governor of New South Wales, Sir John Northcott, to speak.

Sir John Northcott said that they were met together to do honour to the members of the medical profession who had done so much. In the first World War the operations had taken place far away, and the names of many of the medical men who went to that war had since gone down in history. In the last war the men who served and the service they gave were close to all. Sir John Northcott then spoke of the part played by medical officers in the control of tropical diseases, which apart from the wounds

of battle afflicted those serving in the jungle and throughout the Pacific Islands and threatened to wipe them out. He referred particularly to the dangerous situation that had been created by the malaria problem, and to its solution as the result of research on the part of the medical profession, whose members had been with the troops everywhere—up the Kokoda Trail, and in the jungles of New Guinea and Borneo—carrying on their work with the greatest courage. Sir John Northcott said that he did not know any profession whose members gave so much service in a voluntary capacity in peace time as the medical profession, and in both World Wars he had seen something of the things done. To all it was a matter of pride that the profession should have such men, who gave so thoroughly of their service, even to making the supreme sacrifice in the case of those whose names had been read out. He wondered whether the average Australian had any knowledge of what war meant. Although one remembered the bombardment of Sydney Harbour, the



raid attempted by submarines, the destruction of shipping and the air raids on Darwin, that was all. The enemy had been turned back at Buna, Kokoda and other places, and prevented from establishing themselves on the mainland. The great Coral Sea battle followed, and gradually the tide turned. But the first turning was achieved by Australians, and their strength was maintained because of the services of the medical officers. The circumstances of the first World War were not akin to the appalling conditions in the jungle, and Australians must never forget the debt they owed to those who had died, and to those who had served with them. The debt should be made quite clear to the young people growing up. They would be called upon to serve in peace time; they might be called upon to defend their country, and those who depended on them would want their services to be given just as freely as those of their fathers and grandfathers before them. Sir John Northcott referred to the value of memorials of various types, and said that

although there were many in Australia, in New Guinea there was nothing like them. He described his visit to various cemeteries there, in some of which were headstones, in others only a plaque, because of the destruction caused by earthquakes. All the cemeteries were wonderfully kept by the natives who looked after them. High on a hill above one cemetery, in the Owen Stanley Ranges, they had erected a great cross, and outlined in the setting sun it was a symbol of the most wonderful sacrifice in the world. The men who lay at rest in those cemeteries had also paid the price, and to them those who remained owed everything they had. Sir John Northcott described the destruction in countries through which the war had gone, notably New Guinea and Japan. He said that in the harbour at Kure alone 28 capital ships had been sunk; it was a picture of complete destruction. His headquarters had been near Kure, and Hiroshima was one of the cities in the area. There they saw what the destruction wrought by one atom bomb meant; a city the size of Brisbane had been wiped out in an instant. Buildings of concrete, erected after one of the great earthquakes, were lying bent over; all the rest were burnt out. Australia had been saved from all that. The men whose memory they were honouring, the medical officers who had done so much to maintain the forces in the field, had sacrificed their lives that that service might be carried out. He hoped that in the years to come the plaque to be unveiled would be an everlasting reminder to the coming generation, and to the older men, of what they owed to the men whom they were honouring.

The President then invited the relatives of the men whose names were inscribed on the tablet to go up to the first floor landing, to witness the unveiling of the memorial.

His Excellency the Governor unveiled the memorial, and the lamp was lit. The ceremony concluded with the sounding of "The Last Post" and "Reveille".

Medical Societies.

THE PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pædiatric Society of Victoria was held at the Royal Children's Hospital, Carlton, Victoria, on Wednesday, April 14, 1954.

Diabetes Insipidus in Young Children.

DR. H. N. B. WETTENHALL reported three cases of *diabetes insipidus* in young children.

The first case was that of a female child, aged three and a half years, who had been perfectly well until five weeks before attendance at hospital, when she developed an upper respiratory tract infection for which her general practitioner had given her sulphonamide tablets for one week. At that time she had become very thirsty and started to wet the bed at night. From then onwards she had drunk up to eight pints of liquid and passed up to six pints of urine daily. She would drink water from vases and also swallowed a bottle of ink. She was irritable; and if she was denied water, her lips became dry. These symptoms had not improved after a further month's observation as an out-patient, so the child was admitted to the ward for investigation. There the increased fluid intake and output were confirmed. The urinary specific gravity was 1.004 or less, and the urine was clear microscopically. Withdrawal of fluids produced clinical dehydration with dry lips and tongue and a loss of three pounds in weight in thirty-six hours. Despite this, the specific gravity of the urine did not rise over 1.004. The antidiuretic hormone level of her blood as estimated at the Baker Institute was normal. After an injection of 0.1 millilitre of pitressin the urinary flow, which was being measured by means of an indwelling catheter, ceased for nearly five hours, and the child actually refused water to drink. The serum electrolyte pattern and the results of renal function tests were normal. She was pyrexial for the first two weeks in hospital, but the pyrexia disappeared during the latter part of her stay.

Treatment was commenced with pitressin tannate in oil, 0.5 millilitre being given at approximately five-day intervals. At the end of each five days symptoms of polydipsia, polyuria and irritability would recur. Later her general practitioner, Dr. John Storey, decided to try the pitressin applied on pledgets of wool to her nasal mucosa, and was able to extend the interval between injections to ten days. Later again a nasal spray of pitressin was used. At the present time she required three millilitres of the solution every twenty-four hours, and on that therapy alone remained symptom-free.

Two years after the onset of symptoms of the condition she appeared a well child, growing normally, and the urinary specific gravity was 1.022. However, withdrawal of therapy was at once followed by recurrence of symptoms.

The second case was that of a male child, aged nineteen months when first brought under observation. At about twelve months of age he had been noted to be drinking excessively and would take as much as five pints a day. He had severe polyuria and nocturnal enuresis. Examination revealed a well-developed boy with a strikingly red-tipped nose but no other abnormalities. Observation in hospital confirmed the polydipsia and polyuria. Withdrawal of fluid produced intense misery and dryness of the mouth. The urinary specific gravity did not rise above 1.005. Administration of pitressin produced a great reduction in thirst and urinary output. The insulin tolerance test showed hypersensitivity. It was found necessary to give one millilitre of pitressin tannate in oil every five days to control symptoms. Treatment was continued for six months, but then the mother discontinued injection and accepted the advice of a dietitian. The mother stated that the child was now well and not irritable, but still had severe polydipsia and polyuria. One point of interest in the child's history was that his father, paternal grandmother and uncle were all said to drink excessive quantities of fluid. Unfortunately it had been impossible to persuade any of them to present themselves for further examination.

The third case was that of a female child, aged fifteen months, who when first brought under observation was suffering from classical pink disease. She recovered from that, but six months later polydipsia and polyuria were noted. She failed to thrive from that time, and six months later was readmitted to hospital with pyrexia, which ranged from 99° to 105° F. During the next three months she was investigated extensively, and the only really abnormal finding was a urinary specific gravity never over 1.010. After discharge from hospital she improved but was still thirsty; and the mother stated that if she did not get her fluid the temperature would rise. The episodes of thirst and fever seemed to recur monthly and to last about forty-eight hours. About two years after the onset of symptoms of polydipsia and polyuria she was investigated again. The urinary specific gravity never rose above 1.005, and microscopically the urine was clear. The fluid intake varied between three and eight pints daily, and the output was never less than four pints plus wet beds. Excessive thirst and weight loss occurred when fluid was withdrawn, but the urinary specific gravity did not rise. Pitressin produced loss of thirst, reduction in urine output and a pronounced change in temperament. The insulin tolerance test showed hypersensitivity. Injections of pitressin tannate in oil were then continued for four months and subsequently were discontinued; at the present time, nine months later, she was cheerful, and thirst had disappeared except for one to two days every three or four months. Dr. Wettenhall said that she had always been small for her age and was now thirty-two pounds in weight and 37.5 inches tall at the age of five and a half years. It was impossible to be dogmatic about the nature of the child's illness or the prognosis, but the dwarfism might well be related to her pituitary gland. However, epiphyseal development was normal for her age.

Dr. Wettenhall then went on to discuss the condition of *diabetes insipidus* and outlined the diagnosis and treatment. He said that the antidiuretic hormone was formed in the area of the hypothalamus, pituitary stalk and posterior part of the pituitary gland, and that it facilitated resorption of water by the distal tubules of the kidney. Theoretically, symptoms and signs of *diabetes insipidus* might result from absence of antidiuretic hormone, failure of the renal tubules to respond to the antidiuretic hormone or the presence of an antihormone in the blood. The most common cause of the syndrome was a lesion involving the pituitary region. The lesion could be a neoplasm or other space-occupying lesion, an inflammatory disorder such as basal meningitis or arachnoiditis, vascular disorders or trauma which was a sequel to an accident or surgery. In a number of cases, however, no cause could be ascertained. The presence of an antihormone might afford an explanation for the finding of adequate antidiuretic hormone in the blood in Case I. In some cases there was a family history of the disease, but there was no sex preponderance.

Polydipsia was the outstanding symptom, the patient often going to any length to obtain fluid and drinking as much as eight to ten pints daily. Polyuria was present, and the power of concentrating urine was lost, the specific gravity never rising above 1.010. Sometimes enuresis had been the presenting symptom. If fluid was withheld, the patient became dehydrated. Pyrexia was common, and the child's condition might present as one of pyrexia of unknown origin, particularly in infancy, when polydipsia might be mistaken for hunger, and polyuria might not be recognized. Pro-

nounced irritability was almost always present, and the child might be regarded simply as presenting a behaviour problem.

In the three children considered at the meeting a common feature was the presence of a bright-red tip of the nose whenever thirst was severe. Other signs associated with pituitary lesions should be sought, such as dwarfism, adiposity, sexual precocities or infantilism; or neurological evidence of an intracerebral lesion.

The diagnosis should not be difficult, but other conditions should be considered, such as habit drinking, *diabetes mellitus*, urinary tract infections, nephritis and congenital anomalies of the renal tract leading to polyuria. In prisoners-of-war suffering from severe malnutrition, polydipsia and polyuria had been noted.

The treatment of the disease depended on the giving of pitressin. This should first be given as a small dose of water-soluble pitressin; but if no idiosyncrasy was demonstrable, then pitressin should be given by injection as pitressin tannate in oil. The dosage required and the interval between injections were assessed by the child's symptoms. In children it seemed that the time interval between injections was usually in the region of several days. As an adjunct to injection, or in some cases as a total replacement, water-soluble posterior pituitary lobe extract or pitressin might be used as a nasal spray. The value of that had been demonstrated in Case I. Pitressin snuff had been recommended for adults but presented difficulties with children. Nasal absorption might be interfered with when the child was suffering from an upper respiratory tract infection. Once *diabetes insipidus* was diagnosed, it was usually considered that treatment needed to be continued throughout life, although at present this did not seem likely in Case III.

Bone Tumours in Children.

Dr. E. E. PRICE reported a case of Ewing's tumour in a female patient, aged three years. The patient had first come under medical observation at the age of two years and four months. She was stated to have flat feet and a "doubtful limp". That led to X-ray examination of the hips, when there was seen a region of obvious periosteal reaction in the shaft of the femur for two to three inches below the greater trochanter, on all aspects of the bone, with a shallow excavation in the new tissue on the medial side some one and a half inches across. Three days after the X-ray examination she first complained of pain in the right thigh, and a definite limp developed and persisted. Three weeks later, examination showed tenderness in the upper third of the thigh and a little thickening. After admission of the child to hospital for investigation, further X-ray examinations showed the laminated reaction of the "onion layer" type, sun-ray spiculation and increased density of the cortex with mottling in the upper half of the shaft. The findings on X-ray examination of the chest were normal, and no palpable masses or evidence of growth could be found in other parts.

Ten days later a punch biopsy showed numerous undifferentiated round cells with dark nuclei and eosinophilic cytoplasm between the bone trabeculae and replacing the normal marrow. Diagnosis lay between an undifferentiated sarcoma and metastasis from a neuroblastoma. The condition was regarded as one of Ewing's tumour, and radiotherapy was instituted. X-ray examination four months later showed an increased deposition of calcium, but the general features persisted. By that time the clinical condition was very much improved, in that there was no pain or limp, but the upper part of the femur was still thickened. The problem of further management now remained.

Dr. Price said that the treatment of primary malignant disease of bone had always been unsatisfactory, and there was really nothing new which could be brought forward. However, there were two points which he would like to hear discussed—the diagnosis of the degree of malignancy and the place of radiotherapy. In discussing the degree of malignancy he said that, as an overall figure, four out of five patients did not survive five years. However, that included patients with tumours as low grade as the chondrosarcoma, and as active as Ewing's tumour. From the surgical point of view, cases fell into three groups according to the type of operation which was appropriate: firstly, those of the non-recurrent variety, which were innocent and could be treated by curettage; secondly, those of the locally recurrent variety, which could be treated by extra-periosteal removal and bone replacement; thirdly, those of the metastasizing type, which were generally amputated at a convenient proximal level.

Some cases, of course, were unsuitable for surgery, but among those which were suitable the selection of the type

of operation depended to a considerable extent on the degree of malignancy. One turned, therefore, to the radiologist and especially the pathologist for help in determining the degree of malignancy, and the question arose of how conclusive was the evidence from those sources. In particular, how satisfactory was needle biopsy, and could it be assumed that representative tissue was secured? Were the objections to formal biopsy so soundly based as to outweigh other considerations?

In discussing the place of radiotherapy, Dr. Price said that the choice of treatment lay between surgery alone, radiotherapy alone, and continued radiotherapy and surgery. He stated that Platt had reported a series of 161 cases of all types in which the patients were treated by surgery alone, and 23, or 14.3%, survived more than five years. The objection had been raised, however, that surgery actually promoted and stimulated metastasis by liberating certain chemical substances at the site of operation. With regard to radiotherapy alone, the method proved unsatisfactory because some forms of bone tumour were never very selectively sensitive, and in all forms the margin of safety fell with time. Within five years the skin could no longer tolerate the dose necessary, and the case passed out of control, even if metastasis had not supervened.

To meet those objections, various combinations of surgery and radiotherapy had been advocated, and many people believed that some such combination was the ideal method, but the remaining question was: how much radiation and for how long? Some advocated a short destructive course, with amputation within a week. Others preferred fractional repeated irradiation, with amputation in a year or more. Could irradiation so control the primary lesion that the long delay would not in time actually favour the appearance of metastases? That must be doubtful, and in the end the skin might be so damaged that the ideal form of surgery might become impossible. Dr. Price said that the answers to those questions were not known with any certainty, but to his mind irradiation should be used pre-operatively to inactivate the primary lesion. Operation should follow after a short interval, to allow unestablished metastasis to be destroyed. The duration of the interval was really guesswork, but should surely not exceed six weeks.

Dr. F. DOUGLAS STEPHENS presented two patients with bone tumours. The first was a girl, aged nine and a half years, with osteogenic sarcoma. She had complained of mild intermittent aching in the left knee for twelve months. For six days prior to her admission to hospital on March 2, 1954, the pain had become severe, necessitating bed rest. Swelling of the knee had become apparent to the parents four days prior to admission to hospital. No definite history of trauma was elicited.

On examination the child was found to be afebrile and appeared to be in good health. The skin of the knee and the lower part of the thigh was normal, and a diffuse swelling of the lower end of the femur was apparent on palpation; the swelling was tender to deep pressure. There were no glands palpable in the groin. The X-ray appearances of the femur were typical of osteogenic sarcoma. There were areas of bone deposition and some areas of absorption in and around the lower quarter of the femur. The ghost-like remains of the cortex of the femur were apparent through the tumour. There was raising of the periosteum to form Codman's reactive angle, and radiating spicules of bone under the raised periosteum gave the sun-ray effect. Dr. Hiller had made available a series of bone tumour and bone cyst X-ray films, which indicated some difficulties of radiological diagnosis. Examination of the lung fields showed rounded opacities approximately 0.5 to 1.0 centimetre in diameter on each side. Those were regarded as secondary deposits. Because of the secondary deposits in the lungs, Dr. J. G. Whitaker considered that a trial of radiotherapy to the knee was indicated. Dr. R. Kaye Scott had kindly agreed to carry out this treatment.

Dr. Douglas Stephens said that the special point for discussion in the condition under consideration was whether a child with osteogenic sarcoma without obvious metastasis should undergo immediate amputation after confirmation of the diagnosis by biopsy, or whether irradiation should be given first. Coley, in the United States of America, and Platt, in England, advised immediate amputation, while Dr. Kaye Scott was in favour of prolonged preliminary irradiation. It was for discussion of this controversial point that the child had been shown.

The second patient was a boy, aged five and a half years, with benign giant-cell tumour. He had complained for six months of an aching pain in the right knee, occurring every night and becoming gradually worse. For the last three months he had developed a slight limp favouring the right leg. The parents had found a swelling in the right knee.

which was noted to be a little tender. No known trauma could be related to the symptoms.

On examination of the child in hospital on February 26, 1954, a hard thickening of the medial side of the right femur could be palpated. It was maximal in dimensions immediately proximal to the epiphyseal line. Joint movements were not involved. The child's general health was good.

X-ray examination revealed a bone-cyst appearance of the medial side of the diaphysis of the right femur. An area of radiolucent roughly rounded cyst-like appearance replaced the cortex on the medial half. The outline of the femur was expanded over the medial side, and the periosteum was raised to form a covering of egg-shell thickness. There was some coarse trabeculation around the side of the cyst, but there was no reactionary sclerosis of bone adjacent to this structure. The periosteum proximal to the enlargement of the bone was raised and had some "onion layering". The epiphyseal line arrested the extension distally. A note was made by Dr. Freda Plarre that the periosteum was broken through in one site, an appearance suggesting possible malignant change.

Exploratory operation was performed by Dr. Whitaker on April 1, 1954. The thin layer of periosteum was incised with exposure of a large bone cyst containing blood-stained fluid and lined by a reddish granulation tissue-like substance. The bone cavity measured approximately two inches by two inches; after curettage it was filled with bone chips from the bone bank. After closure of the wound the child's leg was enclosed in a plaster spica, and the convalescence was subsequently uneventful.

Microscopic examination of the granulation tissue revealed multiple foreign-body giant cells, with spindle-cell stroma showing no mitotic figures and uniform nuclear appearances. Dr. Alan Williams reported the presence of benign giant-cell tumour.

Undoubtedly there were the benign and malignant forms of giant-cell tumour of bone. Breaking through of the periosteal layers was considered to show a malignant change, indicating a more radical form of treatment. The histological features of the malignant form included a preponderance of tumour giant cells over foreign-body giant cells, and a spindle-celled stroma with pleomorphic nuclei and mitotic figures. Dr. Douglas Stephens asked if these cysts of bone with their lining of giant cells and spindle cells formed in the region of the epiphyseal line where active bone absorption and deposition were constantly occurring in children, were merely derangements in bone activity, or if they were tumours carrying risks of malignant change. It would appear that the cysts had very little tendency to malignant change, and the breaking-down of the periosteum was a less serious consequence, more in the nature of an injury to the thinned-out covering of the cyst. Perhaps the more solid tumours found in adult bones were tumours in the true sense, requiring more radical treatment.

Dr. R. KAYE SCOTT discussed the diagnosis of a lesion in a child aged two and a half years, which ultimately proved to be a Ewing's tumour. When first seen the child had been aged two and a half years, and was found clinically to have a localized tumefaction on the anterior and lateral aspects of the femur, some 5.0 centimetres long. The X-ray films showed an area of involvement of the upper half of the shaft of the femur and neck. Erosion of the cortex on the anterior and medial aspects could be seen, while there was a deficiency of part of the cortex filled by a soft tissue mass in which the typical sun-ray appearance could be seen. The cortex deep to most of the soft tissue tumour showed increased density, and gross expansion of the bone with "onion skin" elevation of the periosteum was present.

The features favouring a diagnosis of osteogenic sarcoma were the age of the child (namely, two and a half years, whereas Ewing's tumour was more commonly found in the years between ten and twenty-five), the area of cortical destruction and the greatly increased bone density with well-developed sun-rays, the localized rather than the diffuse tumefaction, and the absence of areas of medullary rarefaction. On the other hand, the long length of bone involvement, the altered texture of bone with loss of cortex and medullary structure, and the periosteal and endosteal proliferation were features in favour of the diagnosis of Ewing's tumour. At the time the original films were submitted, Dr. Kaye Scott had favoured a diagnosis of osteogenic sarcoma. However, the aspiration biopsy showed sheets of small cells typical of a Ewing's tumour without any evidence of rosette formation.

Dr. Kaye Scott then discussed views on the histogenesis of Ewing's tumour. He said that in general there were two great schools, those who felt that the tumour was primary in bone, and those who felt that the tumour was probably secondary to some other tumour; the second school was led

by Willis, who believed that a primary neuroblastoma was a common cause of Ewing's tumour. Dr. Kaye Scott had little hesitation in believing that there was truth in the views of both schools, some tumours being primary and others undoubtedly secondary.

Neuroblastoma might be diagnosed with some certainty if a rosette pattern was seen on the histological appearances. There was no other distinctive feature; but if the tumour was dedifferentiated, there still could be a sheet of cells without rosettes with a primary neuroblastoma causing the secondary tumour in bone.

A primary reticulum-cell sarcoma of bone was well recognized, with characteristic reticulum cells, sometimes with reticulin formation. Those cells were generally of a different type from Ewing's tumour, having a large amount of protoplasm and a vesicular nucleus with a fine chromatin network. Ewing's cells were of a different type, smaller, and having definite amounts of protoplasm and a relatively large nucleus with much chromatin substance present. Such a picture did not fit in with a dedifferentiated reticulum-cell sarcoma and was not seen elsewhere in situations where reticulum-cell sarcomata were commonly seen.

So a tumour definitely secondary to a neuroblastoma of adrenal or paravertebral ganglionic origin, or even to a retinoblastoma, could show a dedifferentiated arrangement simply with sheets of cells, or alternatively the differentiated type with rosettes present. Therefore there was nothing to separate the dedifferentiated type from a tumour arising locally and primarily in the bone. Because the appearances were different from those usually seen with a reticulum-cell sarcoma, that origin could not yet definitely be sustained, and so most workers were content to retain the name "Ewing's tumour".

Radiation treatment alone had given remarkably few cures of the disease over the years. The tumour was found to be initially very responsive, but later local recurrence appeared inevitable, probably owing to a moiety of resistant cells present, and ultimately the inevitable recurrences appeared in other bones. Dr. Kaye Scott said that he had used high dosage techniques and prolonged fractionation, and he thought that the latter gave more permanency of local result. On Willis's theory he had directed treatment to the paravertebral region from diaphragm to sacrum, combined with the local treatment of the first lesion seen in bone, but this had not significantly altered his results.

Reviewing the surgical treatment, he quoted Lichenstein ("Bone Tumours", C. V. Mosby Company, St. Louis, 1954, page 191), who knew of only one authentic case record in which cure was accepted. Lichenstein did not accept most of the cures in the surgical figures previously reported on account of the great difficulty in establishing an absolutely satisfactory histological diagnosis. Most series of the so-called Ewing's tumours included certain lymphomatous tumours, some reticulum-cell sarcomata and possibly anaplastic carcinomata.

Dr. Kaye Scott said that at a meeting at the Children's Hospital two or three years previously he had stressed the failure of radiotherapy alone, and apparently of surgery alone, and had suggested that if a suitable case arose, heavy preliminary irradiation should be given and after an adequate interval amputation should be considered on the basis that the tumour might be a primary one arising in bone. If obvious rosette formation was present, or if the condition was secondary to a known primary lesion elsewhere, then the treatment would be hopeless. But such a policy in suitable cases might give some cures.

In the present instance the child had been under treatment for some six months, it had responded well to multiple courses of X-ray therapy, and no other secondary deposits had appeared in viscera or bones. Dr. Kaye Scott thought that a further course of X-ray therapy should be given; and if the child was then still free of secondary deposits, disarticulation of the leg at the hip joint should be carried out.

Commenting on the second patient shown, Dr. Kaye Scott restated his policy in regard to the treatment of osteogenic sarcoma, which he had been following since 1936. He said that the tumour was relatively resistant to any high-dosage attack with radiotherapy, but he had been able to show over the years that the tumour showed control and local repair with small fractionated doses of X-ray therapy carried on intermittently over long periods. Initially a course of ten weeks was given with a tumour dose of 4500r, treatment being given three times a week. After a ten weeks' rest a further course was given, and three, possibly four, courses of therapy were administered over a period of at least twelve months. He had been able to show that in the fibro-type of osteogenic sarcoma a response with repair and tumour control was very frequently obtained, but in the osteo-type results had been much less satisfactory until

recently, when some success had been obtained by increasing the tumour dose in the first course to 6000r in ten weeks. Dr. Kaye Scott believed firmly that this treatment was not curative, but that it would hold the tumour in control for some considerable time. It would be reasonable to suggest that local inactivation of the tumour would be associated with a cessation of metastasis of tumour cells from the primary site to the blood-stream. Further, it was well known that the lungs had a considerable defensive mechanism for overcoming tumour emboli, and that only very few of such emboli reaching the lungs ever grew, the great majority suffering destruction. However, if flooding of the pulmonary capillary bed continued indefinitely, then sooner or later some of the cells would grow. It was reasonable to assume that in every case of osteogenic sarcoma tumour emboli were present in the lungs when the patient was first seen, even if deposits were not obvious radiologically. It was felt that if such flooding of the lungs could be stopped, then the patient might have some chance of overcoming his preexisting microscopic metastases; and only if such a mechanism did occur would the patient have any chance of a cure.

Dr. Kaye Scott said that he had postulated early that damage to tissues by major surgery possibly liberated growth-promoting substances which stimulated metastases in the lungs to grow, thus destroying the natural defence mechanism. For that reason surgery should not be contemplated as the immediate treatment for any such tumour. But irradiation could not cure the condition alone, and local recurrences had appeared in his series after intervals of four and a half years to seven years. Study of the time of appearance of metastases had shown that some patients developed metastases during the first ten weeks' course of treatment, but very few patients developed metastases twelve months after starting treatment. Therefore, it seemed that at least twelve months or probably eighteen months should be allowed for radiation treatment before any thought of amputation was considered. If during that time the patient developed metastases in the lungs, nothing constructive could be done and the patient must be regarded as lost. There was general consensus of opinion that immediate amputation caused flare of metastases, and a great majority of the patients died within three months.

On this basis Dr. Kaye Scott therefore recommended a treatment policy of prolonged fractionated irradiation, during which time the patient should have his resistance built up with blood transfusions, adequate feedings, accessory vitamin therapy, and immobilization of the affected area of the limb to stop passage of malignant cells into blood vessels. If the patient then remained free of metastases and the tumour showed evidence of control, amputation should be carried out, preferably after the twelve months and before eighteen months. However, some patients had not responded to the radiation treatment, and under those circumstances there was no alternative but to submit them to immediate surgery.

In the present case the patient had been seen with a well-differentiated osteo-type of osteogenic sarcoma, and metastases were thought to be present in the lungs when the child was first seen. This had been definitely confirmed a month later. X-ray therapy had been started to the primary region, so that it would not get out of hand and cause tumour ulceration or fungation or disorganization of the limb during the time that the pulmonary metastases were controlling the terminal phases. Dr. Kaye Scott quoted a case in which pulmonary metastases of this type had been slowly growing over a period of three and a half years, and another case in which a similar tumour of the tibia had been treated, treatment with X-ray therapy had been stopped because of the appearance of pulmonary metastases, and near fungation had occurred in the subsequent four months, as a primary recurrence grew much more quickly than did the pulmonary secondary deposits. For that reason he thought that therapy to the primary lesion should be continued for a reasonable time.

Dr. H. G. HILLER demonstrated skiagrams of Dr. Stephens's first patient, taken that day. He said that the tumour had increased in size. The skiagram of the chest was not available but showed an increase in the number of secondary deposits in both lungs.

Dr. Hiller then demonstrated skiagrams of other bone diseases, including Brodie's abscess, simple cyst, eosinophilic granuloma, fibrosarcoma, osteomyelitis, and Wilms's embryoma metastasizing in bone. He said that all showed a resemblance to Ewing's tumour, and illustrated the difficulties in the identification of localized bone disease. It was unwise to expect a radiologist to provide an unequivocal diagnosis in all cases.

Referring to the so-called benign giant cell tumour, Dr. Kaye Scott said that he had seen the skiagrams for the first

time that night. The cortex of the femur showed a small break, there was periosteal elevation extending for three inches up the shaft, laying down of new bone, and an absence of sharp differentiation between cortex and medulla, together with loculation. The diagnosis of benign giant-cell tumour was open to doubt. Even though biopsy might now show a benign appearance, there might be evidence of malignant changes in one year's time. In his opinion, giant cells were too small and too few, and spindle cells were too numerous for the tumour to be benign.

Dr. Kaye Scott said that in his opinion the treatment by irradiation should be protracted, and should consist of at least four courses of ten weeks' duration with intervals of ten weeks between courses, the lot taking over eighteen months. Short-term intensive therapy only resulted in necrosis. Radiotherapy should be used before surgical procedures were attempted. There was reason to believe that immediate surgery, such as amputation, would liberate growth-promoting substances which stimulated the growth of metastases. The procedure in Melbourne was to use fractionated long-term irradiation before surgery.

Dr. E. E. Price said that he considered that over a period of twelve to fifteen months whilst irradiation was being carried out there was opportunity for metastases to develop. There was a critical period, and if amputation was delayed beyond that, time was against and not with the patient.

Dr. Kaye Scott said that it would have been better had an aspiration biopsy of the giant-cell tumour been carried out with a drill. He considered that the tumour was malignant, that it would recur and that irradiation and amputation would be required. Local treatment would be ineffective.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

HARDSHIPS IN THE EARLY DAYS.¹

[From White's "Journal of a Voyage to New South Wales".]

29 January, 1788.

THIS day Captain Hunter and Lieutenant Bradley began to take a survey of the harbour. In the course of the last week all the marines, their wives and children together with all the convicts were landed. The laboratory and sick tents were erected and I am sorry to say, were soon filled with patients afflicted with the true camp dysentery and the scurvy. More pitiable objects were perhaps never seen. Not a comfort or convenience could be got for them besides the very few we had with us. His Excellency seeing the state these poor objects were in, ordered a piece of ground to be enclosed for the purpose of raising vegetables for them. The seeds that were sown upon this occasion, on first appearing above ground looked promising and well but soon after, withered away; which was not indeed extraordinary as they were not sown at the proper season of the year. The sick have increased since our landing to such a degree that a spot for a general hospital has been marked out and artificers already employed on it. A proper spot contiguous to the hospital, has been chosen, to raise such vegetables as can be produced at this season of the year and where a permanent garden for the hospital is to be established.

Correspondence.

A SIGN OF ACHLORHYDRIA.

SIR: I wonder if it would be helpful to your readers for me to call their attention to a sign of achlorhydria in the adolescent—namely, a band of redness half an inch wide on the nose about half to three-quarters of an inch from the tip. For many years I have had the opportunity of observing several familial cases of achlorhydrosis and find this band

¹From the original in the Mitchell Library, Sydney.

is usually present. It does not seem to be often recognized in the late adolescent, judging from the number of people who have been taking antacid mixtures unnecessarily. Also on three occasions I have been called out to an 'acute abdomen' which was nothing more than a gastritis, clearing up on acid.

Yours, etc.,

EDITH E. ANDERSON.

217 Burwood Road,
Burwood,
New South Wales.
June 24, 1954.

THE TRAINING OF MEDICAL STUDENTS.

SIR: Two letters published in THE MEDICAL JOURNAL OF AUSTRALIA, July 10, 1954, call for comment.

At the outset it should be remembered that the only authority concerned with student education is the University with the help of its official clinical schools. The Post-Graduate Committee in Medicine, the Royal Colleges and the general profession represented by the British Medical Association may have special responsibilities for education, but only post-graduate education.

Let it also be understood that nobody claims that our teachers are inefficient or that the Australian student has a poorer brain than those of other countries.

I do not propose to discuss in detail the letters, which in point of fact nullify each other in their wish to improve or leave *in statu quo* present-day student education. The first by Dr. Rose follows the philosophy of Dr. Pangloss in "Candide"—the best of all possible, possible worlds—and Dr. Kent Hughes diametrically implies the opposite.

What I do wish to stress (and I am in the good company of the Goodenough Report on Medical Education and the recent Report on Australian Teaching Hospitals by Dr. Malcolm MacEachern) is:

1. Many of the present outdated and overcrowded teaching hospitals of Australia should be modernized, if not demolished and rebuilt.
2. Additional beds should be provided in these teaching institutions to cope with the increasing number of medical students. I would advise Dr. Rose to read carefully the mentioned reports on student ratio.
3. That proper facilities such as lecture halls, conference rooms, consulting offices, ward laboratories, libraries, student equipment, retiring rooms, living-in accommodation, lay recorders *et cetera* be provided for both teachers and students in order to increase efficiency.
4. That an efficient ratio of teachers to students be maintained. Why do the Armed Forces limit the number in a regiment or a brigade?
5. That the teachers who all give honorary service to patients in the public wards be adequately paid for their service to medical education.

Australia has never adequately paid for student medical education, which costs the Australian universities and their clinical schools £1108 per annum per student. As there are 3521 medical students in training in the Commonwealth, it needs only mathematics to arrive at the colossal amount such education costs the country.

Lastly, I might add that the lay Press has always been sympathetic, honest and fair on educational problems, and on this question has only published extracts from official reports and official deputations.

Yours, etc.,

HERBERT SCHLINK.

Sydney,
July 13, 1954.

NATIONAL HEALTH (PHARMACEUTICAL BENEFITS) REGULATIONS.

SIR: We wish to indicate our approval of the attitude expressed by Dr. A. E. W. Burrell and his colleagues of Griffith, and Dr. Lindsay Dey, in THE MEDICAL JOURNAL OF AUSTRALIA of July 3. We have for some time been of the opinion that the profession was being "sold down the river" by the spate of alterations and restrictions to the schedule of benefits allowed under the *Pharmaceutical Benefits Act* as originally gazetted. The original schedule was, we feel, both adequate and generous, and of real use to the practitioner.

Since the Act became law, however, we have witnessed the gradual curtailment of our power to prescribe, as first one and then another benefit have been decreased in quantity, or removed altogether. Now we are limited in certain cases to using quantities which are so small as to become ludicrous.

We further feel very strongly on the latest regulations governing the size of the script form itself, and departmental insistence upon a duplicate form at the doctor's expense. In the early days of the scheme, forms in duplicate, with carbon paper, were supplied to the practitioner by the department. Now, the supply has been stopped, and the doctor must, at his own expense, use two script forms where he formerly used one only. And if his script block is over half an inch larger or smaller than prescribed by the Department of Health, the patient is unable to receive his benefit. This usually means that the chemist who has supplied the drug(s) has his claim refused and is left to bear the expense. The latest restrictions and deletions mean, in at least one instance of our own practice, that where one (duplicate) script formerly sufficed for a pensioner, now we must write no fewer than five.

More and more the profession is being submitted to rule by regulation and is at the mercy of lay persons. The old doctor-patient relation of trust and confidence has been undermined and, in many cases, altogether destroyed. Before the patient can obtain payment of benefits from the appropriate department, details—exact, as is often stressed—of his or her ailment, and the treatment thereof, must be furnished to the agent, whoever he may be, of the society through which the individual pays his dues. In our district such agents include farmers, accountants, a legal firm, a chemist and a millhand. We cannot but feel that however worthy these persons may be, they are not entitled to the particulars, which have for so long been regarded as the property and business of two people only, the patient and his chosen medical man.

We heartily endorse the opinions of and course of action hinted at by our colleagues; we feel that it should be the urgent duty of the officers of our Association to take such action as may be indicated to remove from our shoulders the load of restrictions and expense with which we are burdened, and to restore to the profession its former dignity and prestige.

Yours, etc.,

C. W. HAMMOND.

G. E. W. STREETEN.

Maclean,
New South Wales,
July 4, 1954.

REGISTRATION OF MEDICAL PRACTITIONERS IN NEW SOUTH WALES.

SIR: The art of invective to draw attention to stupidity or injustice having fallen into the disfavour necessary to preserve it from banality, redress must be sought through objective reporting: detached, dispassionate description.

On October 7, 1948, I received a letter from the New South Wales Medical Board informing me that my permanent registration had been approved. Appreciating that a recent circular from the Board demanding payment of one guinea annually under threat of removal from the Register constituted a unilateral breach of agreement, I wrote on June 2, 1954, to the New South Wales Branch of the British Medical Association requesting advice. The reply, dated June 29, justified the Board's action by drawing a parallel with other trades and professions. The amounts paid by, amongst others, plumbers (including fees for registration as a drainer in first, second and subsequent years), gas-fitters and electrical contractors were tabulated. To be fair I must admit that the registration fees of optometrists, pharmacists, physiotherapists, dentists, solicitors, accountants and veterinary surgeons were given in no less detail.

One such quotation would have been sufficient to illustrate the point, except perhaps to a mental defective. Multiplication of irrelevant cases adds no strength to a weak argument. The implied insult to our intelligence will not endear doctors to the Association, whilst the waste of time and paper, trivial in the instance, suggests, if progressive, that the staff could be more profitably occupied.

The issue is not that the terms of registration should depend upon an annual fee to the State, conforming to the law relating to certain other tradesmen, but whether a doctor who has once been "permanently" registered should be removed from the Register without his having been

guilty of misconduct grave enough to justify such a penalty. The State has the right to alter its legislation for future registration, but has no more right than any individual to dishonour its existing obligations. A wrong does not become right when enacted under theegis of government.

What can they know of honour who only power know?

Yours, etc.,
R. D. G. VANN, M.R.C.S.
Byron Bay,
New South Wales,
July 3, 1954.

A SPLINT FOR USE DURING BLOOD TRANSFUSION IN INFANTS.

SIR: In your issue of July 3, 1954, Dr. Ralph D. Upton has described a splint for use during blood transfusion in infants. Better immobilization may be obtained by applying a close-fitting plaster slab from the toes to the upper region of the thigh. The slab should be fairly thick and heavy. Immobilization is practically perfect by this method, which is well worth the extra inconvenience of the plaster.

Yours, etc.,
R. W. NICHOLS.
Yackandandah,
Victoria,
July 5, 1954.

RUBELLA (GERMAN MEASLES, ROTHEN, RUBEOLE).

SIR: The writer of the excellent article on rubella, in the series "Special Articles for the Clinician", M. J. AUSTRALIA, I: 488 (1954), poses the problem: "A patient in the first four months of pregnancy has developed clinical rubella; what can be done?" And his answers serve to recall to readers that no satisfactory solution to the dreadful problem has yet been achieved.

This state of affairs prompts me to record that, in the last eight years of ophthalmic practice, including honorary attendance at a public children's hospital, I have not seen one new case of congenital eye lesions in any way related to maternal rubella. Neither have I heard of any of my colleagues in the Brisbane area who has seen such a case.

This may be due to the fact that the total number of cases of rubella in the Brisbane area during the last eight years has been small. It may equally well be due to other reasons. However, it does also indicate the possibility that the rubella virus, having undergone mutation, has not lately possessed the potential of producing its dire effects upon the developing foetus.

The present is a stage between epidemics, and I think an effort should be made to discover whether the rubella virus of 1954 is capable of causing similar congenital lesions to that of vintage 1938-1940.

Sir Norman Gregg (*Tr. Ophth. Soc. Australia, 1944*) has said: "I am convinced that the only way to attack the problem is by team work. In any future investigation it will be important to search for and to record negative cases."

My suggestion is that we should now follow Sir Norman Gregg's advice on an Australia-wide basis. Perhaps each State health department would be willing to receive and record reports of any known cases of rubella in the first four months of pregnancy, where a normal child has subsequently been born. Analysis of such negative results might conceivably do much to lift the present veil of uncertainty.

Yours, etc.,
FERGUS M. YEATES.
Ballow Chambers,
Wickham Terrace,
Brisbane, B.17.
July 7, 1954.

Post-Graduate Work.

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR AUGUST.

Visit of Professor E. B. Astwood.

From August 1 to 15 Dr. E. B. Astwood, M.D., Research Professor of Medicine, Tufts Medical School, Boston, United States of America, will visit Melbourne as the official 1954 Overseas Lecturer of the Australian Post-Graduate Federa-

tion in Medicine. Dr. Astwood is an endocrinologist, noted for his work on internal secretions, thyroxine and the control of hyperthyroidism by non-surgical means. He will give the following lectures for the Post-Graduate Committee at 8.15 p.m. in the lecture theatre at the Royal Australasian College of Surgeons unless otherwise stated.

Monday, August 2: "Medical Treatment of Thyroid Diseases."

Thursday, August 5: "Clinical Use of Corticotropin and Adrenal Steroids."

Monday, August 9: "Disorders of the Hypophysis."

Thursday, August 12: "Pituitary Hormones", in the British Medical Association Hall.

The fee for this course is at the rate of 15s. per lecture. Those who have paid an annual subscription to the Committee are invited to attend without further charge, and need no ticket.

In addition to the above lectures, Dr. Astwood will engage in the following programme:

Monday, August 2: 9 a.m., lecture to medical students at the University of Melbourne, followed by visit to university departments.

Tuesday, August 3: 10 a.m., lecture to medical students at the University; 8 p.m., staff clinical meeting at Saint Vincent's Hospital, with discussion of cases.

Friday, August 6: 10 a.m. to 1.45 p.m., visit to Clinical Research Unit and clinico-pathological meeting at the Royal Melbourne Hospital.

Tuesday, August 10: visit to the Alfred Hospital, including the Clinical Research Unit.

Wednesday, August 11: 2 p.m., visit to Prince Henry's Hospital.

Lecture by Dr. Robert Shaw.

On Monday, August 23, Robert Shaw, M.D., thoracic surgeon, of Dallas, Texas, will speak at 8.15 p.m. in the lecture theatre, Royal Australasian College of Surgeons, on "The Early Detection of Bronchogenic Carcinoma". Dr. Shaw is Clinical Associate Professor of Thoracic Surgery of the Southwestern Medical School, University of Texas. The fee for this lecture will be 15s., payable to the Post-Graduate Committee. Those who have paid an annual subscription to the Committee are invited to attend without further charge and need no ticket.

Country Courses.

Ballarat.

At Craig's Hotel, Ballarat, on Thursday, August 26, at 8.15 p.m., Dr. H. McLorinan will speak on "Modern Treatment of Infectious Diseases".

Flinders Naval Depot.

At Flinders Naval Depot, on Wednesday, August 11, at 2.30 p.m., Dr. Keith Bradley will speak on "Pain following Amputation of a Limb". This is by arrangement with the Royal Australian Navy.

Lecture by Sir James Learmonth.

Attention is drawn to the lecture by Sir James Learmonth, K.C.V.O., C.B.E., F.R.S., F.R.C.S., Professor of Surgery in the University of Edinburgh, who will be in Melbourne in August as the visiting Sims Professor and will take part in the meeting of the Royal Australasian College of Surgeons. The State Committee of the College has arranged for him to lecture to the medical profession generally on Thursday, August 26, at 8.15 p.m. in the College lecture theatre on "The Treatment of Peripheral Vascular Disease". This lecture is open to all members of the profession, without charge.

General.

The address of the Melbourne Permanent Post-Graduate Committee is 394 Albert Street, East Melbourne. Telephone: FB 2547.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Film on "Cardiac Resuscitation".

The Post-Graduate Committee in Medicine in the University of Sydney announces that Dr. Frank Gerbode, of San Francisco, has presented a copy of his film on "Cardiac Resuscitation" to its film collection. This film may now be obtained on loan from the New South Wales Film Council.

61 Hunter Street, Sydney, who handle the Committee's film collection. Intending borrowers must first be registered with the Committee, after which they may apply direct to the Film Council, who require a minimum of fourteen working days' notice. Borrowers must comply with the Film Council's rules and bear the cost of dispatch and return of all films.

A film catalogue containing details and appraisals of all medical films available in Sydney for loan may be obtained from the Committee at a cost of £2 2s. The catalogue contains films appraised up to December 31, 1953. Further inquiries may be made from the Course Secretary, The Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 5238, BW 7483.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 40, of July 1, 1954.

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

Royal Australian Army Medical Corps.

To be Captain, 4th May, 1954, with a Short Service Commission for a period of one year: 2/40169 Ronald Shaw Hemmings.

Citizen Military Forces.

Eastern Command: Second Military District.

Royal Australian Army Medical Corps (Medical).—To be Captain (provisionally), 6th April, 1954: 2/130111 Joseph Anthony Jaconelli.

Southern Command: Third Military District.

Royal Australian Army Medical Corps (Medical).—The following officers relinquish the provisional rank of Captain and are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (3rd Military District) in the honorary rank of Captain, 25th March, 1954: 3/101805 J. P. Morris and 6/15407 A. F. Hargrave.

Central Command: Fourth Military District.

Royal Australian Army Medical Corps (Medical).—4/31927 Captain S. C. Milazzo is seconded whilst undergoing post-graduate studies in the United Kingdom, 7th January, 1954. To be Captain (provisionally), 11th May, 1954: 4/32050 Roderick Alan Westerman.

Tasmania Command: Sixth Military District.

Royal Australian Army Medical Corps (Medical).—To be Captains (provisionally), 7th May, 1954: 6/15415 Raymond Maldwyn Hughes and 6/15414 Allan John Foster.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

1st Military District.—To be Honorary Captains, 7th May, 1954: Brian Carvolth Elliott, Paul Kelleher Smith and Glenister Shell.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force.

John Joseph Bain (0210563) is appointed to a short-service commission, on probation for a period of twelve months, 1st February, 1954, with the rank of Flight Lieutenant.

The following officers are granted acting rank as indicated, 3rd May, 1954: (Wing Commander) Squadron Leader H. T. Hardy (036451), (Squadron Leader) Flight Lieutenant R. G. Sharp (028027).

The short-service commissions of the following Flight Lieutenants (Acting Squadron Leaders) are extended for a period of three years: D. B. Heylan (023063), 3rd July, 1954, K. M. Woods (023095), 21st July, 1954.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JULY 3, 1954.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	2	2(2)	..	..	..	..	..	..	4
Amoebiasis .. ..	..	..	..	..	2(2)	..	..	..	2
Ancylostomiasis	2	..	..	..	..	..	1	..	3
Anthrax .. ..	..	..	..	..	..	..	..	..	..
Bilharziasis .. ..	..	..	..	..	..	..	..	..	..
Brucellosis .. ..	..	2(2)	..	..	..	..	..	..	2
Cholera .. ..	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus) .. ..	..	1(1)	..	..	..	..	..	..	1
Dengue .. ..	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile)	9(8)	..	2(2)	..	..	..	1	..	12
Diphtheria	16(6)	..	3(1)	..	1(1)	..	..	1	21
Dysentery (Bacillary) .. ..	..	1	2(2)	..	1(1)	..	1	..	5
Encephalitis	1(1)	..	..	..	..	..	..	..	1
Filariasis .. ..	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice .. ..	..	..	..	..	..	..	..	..	..
Hydatid .. ..	..	..	..	..	..	..	..	..	..
Infective Hepatitis	34(14)	21(9)	..	..	4(2)	..	1	..	60
Lead Poisoning .. ..	..	..	..	..	..	..	..	..	..
Leprosy .. ..	..	..	..	..	..	..	..	..	..
Leptospirosis .. ..	..	..	1(1)	..	..	..	..	..	1
Malaria .. ..	..	1	3(1)	..	5(5)	..	..	..	9
Meningococcal Infection	3(1)	1	2(1)	..	1	..	..	..	7
Ophthalmia .. ..	..	..	..	..	..	..	..	..	..
Ornithosis .. ..	..	..	..	..	..	..	..	..	..
Paratyphoid .. ..	..	..	..	..	..	..	..	..	..
Plague .. ..	..	..	..	..	..	..	..	..	..
Pollomyelitis	7(6)	11(11)	3(1)	1(1)	1(1)	..	..	..	23
Puerperal Fever .. ..	..	..	..	..	..	..	..	..	..
Rubella .. ..	..	4(4)	..	..	11(7)	..	..	..	15
Salmonella Infection .. ..	..	..	..	..	2(2)	..	..	..	2
Scarlet Fever	7(6)	42(17)	7(6)	6(6)	2(2)	3(3)	..	..	67
Smallpox .. ..	..	..	..	..	..	..	..	..	..
Tetanus .. ..	..	..	1	..	..	..	..	..	1
Trachoma .. ..	..	..	..	..	4	..	..	..	4
Trichinosis .. ..	..	..	..	..	..	..	..	..	..
Tuberculosis	35(22)	23(16)	42(15)	4(4)	5(2)	4(1)	..	..	113
Typhoid Fever .. ..	..	..	..	..	1(1)	1	..	..	2
Typhus (Flea-, Mite- and Tick-borne) .. ..	..	..	1	..	..	..	..	..	1
Typhus (Louse-borne) .. ..	..	..	..	..	..	..	..	..	..
Yellow Fever .. ..	..	..	..	..	1(1)	..	..	..	1

¹ Figures in parentheses are those for the metropolitan area.

Public Health.

FOOD AND DRUGS ACT, 1908-1953, SOUTH AUSTRALIA.

THE following proclamation by His Excellency the Governor of the State of South Australia appears in the *South Australian Government Gazette*, Number 29, of July 1, 1954:

By virtue of the provisions of the *Food and Drugs Act*, 1908-1953, I, the said Governor, with the advice and consent of the Executive Council, do hereby declare that chlordane shall be a poison within the meaning of the said Act.

Given under my hand and the public seal of South Australia, at Adelaide, this 1st day of July, 1954.

By command,

A. LYELL McEWIN, Chief Secretary.

The Royal Australasian College of Physicians.

RESEARCH FUND.

THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS invites medical practitioners to submit applications for grants from the Research Fund of the College before September 15, 1954. Applications should be made on the prescribed form, which may be obtained from the Honorary Secretary of the College at 145 Macquarie Street, Sydney.

Royal Australasian College of Surgeons.

OPEN MEETING.

A MEETING of the Royal Australasian College of Surgeons will be held in the Stawell Hall, The Royal Australasian College of Physicians, 145 Macquarie Street, Sydney, on Wednesday, July 28, 1954, at 8.15 p.m. The subject will be "Sequelae of Head and Face Injuries", and the speakers will be Mr. R. A. Money, Mr. D. Officer Brown and Mr. C. Blakemore.

This meeting is open to all members of the medical profession.

Notice.

FILM ON "THE KIDNEY IN HEALTH AND DISEASE".

THE Section of Urology of the New South Wales Branch of the British Medical Association is arranging for a film entitled "The Kidney in Health and Disease" to be shown at the Shell Theatre, Shell Building, 12 Carrington Street, Sydney, on Monday, July 26, 1954, at 8 p.m. The film is one of those prepared by Eli Lilley and Company. All those interested are invited to be present.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Roberts, Ivor Charles, M.B., B.S., 1952 (Univ. Adelaide), Box 289, Post Office, Broken Hill, New South Wales.

THE undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Savage, John Patrick, M.B., B.S., 1954 (Univ. Adelaide) (qualified 1953), 4 Godfrey Terrace, Leabrook, South Australia.

Kneebone, Garry Malcolm, M.B., B.S., 1953 (Univ. Adelaide) (qualified 1952), Box 7, Pinnaroo, South Australia.

Fuller, William Rayner, M.B., B.S., 1953 (Univ. Adelaide) (qualified 1952), 63 Glynde Road, Ffrie, South Australia.

THE undermentioned have been elected as members of the South Australian Branch of the British Medical Association: Dunstone, David Darroch, M.B., B.S., 1954 (Univ. Adelaide); Craven, Dilys Mary, B.Sc., M.B., Ch.B., D.C.H., 1942; Watson, Kenneth Graham, M.B., B.S., 1953 (Univ. Adelaide) (qualified 1952); Watson, Arthur John, M.B., B.S., 1953 (Univ. Adelaide) (qualified 1952); Sweeney, Robert James, M.B., B.S., 1953 (Univ. Adelaide) (qualified 1952).

Deaths.

THE following deaths have been announced:

NEWMAN.—Ernest Ludlow Newman, on July 9, 1954, at Sydney.

SHAW.—Richard Glinn Vallack Shaw, on July 11, 1954, at Sydney.

Diary for the Month.

JULY 27.—New South Wales Branch, B.M.A.: Ethics Committee.

JULY 28.—Victorian Branch, B.M.A.: Branch Council.

JULY 29.—New South Wales Branch, B.M.A.: Branch Meeting.

JULY 29.—South Australian Branch, B.M.A.: Scientific Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Tasmania: Part-time specialist appointments for the north-west coast of Tasmania.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any per annum within Australia and the British Commonwealth of Nations, and £6 10s. per annum within America and foreign countries, payable in advance.